WORLD'S POULTRY SCIENCE JOURNAL

APRIL - JUNE

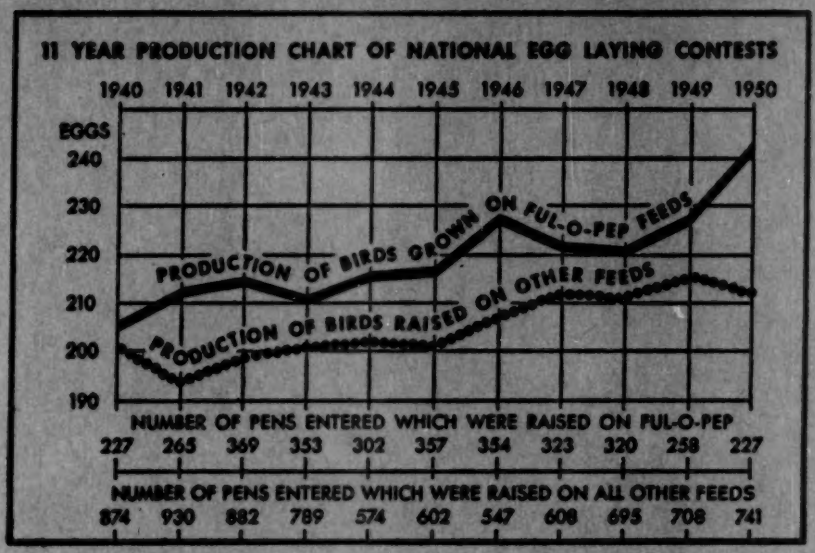
1951

Official Organ of the

WORLD'S POULTRY SCIENCE ASSOCIATION

Volume 7 - Number 2

National Egg Laying Contests prove
FUL-O-PEP GROWS AMERICA'S BEST PULLETS!


11 YEAR PRODUCTION CHART OF NATIONAL EGG LAYING CONTESTS
1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950
EGGS
240
230
220
210
200
190
PRODUCTION OF BIRDS GROWN ON FUL-O-PEP FEEDS
PRODUCTION OF BIRDS RAISED ON OTHER FEEDS
NUMBER OF PENS ENTERED WHICH WERE RAISED ON FUL-O-PEP
227 265 369 353 302 357 354 323 320 258 227
NUMBER OF PENS ENTERED WHICH WERE RAISED ON ALL OTHER FEEDS
874 930 882 789 574 602 547 608 695 708 741

Birds grown on Ful-O-Pep average laying the equivalent of 14½ MORE 2-OZ. EGGS EACH

INFORMATION PRESENTED in the above chart is excellent proof that Ful-O-Pep grows America's Best Pullets.

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IN THE 1950 CONTESTS Ful-O-Pep raised birds averaged laying the equivalent of 29 more 2-oz. eggs each than birds grown on all other brands of feed. Ful-O-Pep feeders also won high pen in 10 and high hen in 7 of the 15 official tests.

CERTAINLY THIS SUPERIOR egg production is outstanding proof that Ful-O-Pep Research is building better feeds. Best of all, the Ful-O-Pep Restricted Feeding Plan saves poultrymen up to 30% feed cost for growing pullets . . . the kind of birds that produce well and stand up under the strain of heavy, continuous laying.

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WORLD'S POULTRY SCIENCE JOURNAL

Volume 7 April-June Number 2

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Published quarterly by the

WORLD'S POULTRY SCIENCE ASSOCIATION

Cornell University, Ithaca, N. Y., U.S.A.

Membership dues $3.00 a year of which $2.50 is for a year's subscription to the "World's Poultry Science Journal." Subscription rate, $3.50 a year. Advertising rates upon application.

Entered as second class matter May 31, 1945 at the Post Office at Ithaca, N. Y., under the act of March 3, 1879.

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NINTH WORLD'S POULTRY CONGRESS
Paris, France, August 29, 1951

The French Committee of the World's Poultry Congress reports progress in the plans for the Congress. About 40 nations are expected to be represented with an attendance of over 4,000.

OFFICIAL LANGUAGES

The official languages of the Congress will be English and French. Interpreters will be attached to the Congress to undertake all verbal translations so necessary to the smooth running of the proceedings and to assist Congress Members with limited or no knowledge of either English or French.

SESSIONS AND EXHIBITIONS

The President of the Ninth World's Poultry Congress and of the International Poultry Exhibition will preside the sittings of the Congress. If absent, he will be replaced by one of the Vice-Presidents.

DAILY PROGRAM

Wednesday, August 1st, 10 a.m. - 6 p.m.: Registration of Congress Members at the General Secretariat of the Congress where they will receive all documents to which they are entitled according to their class of membership. (Member's badge, final Programme, Printed Reports, Invitations, tickets for excursions, etc.).

Thursday, August 2nd, 9 a.m. - 12 noon: Continuation of the registration of Congress Members.

3:30 p.m.: Official Opening of the Congress by the Minister of Agriculture.

M. Vincent Auriol, President of the Republic, will receive the Heads of the Official Delegations at a reception to be given at the Elysee (Residence of the President), hour and day of the reception will be given subsequently.

Friday, August 3rd, 9 a.m. - 12:30 p.m.: Plenary Meeting: General Papers.

3 p.m.: Official Opening of the International Poultry Exhibition.

August 4th, 6th, 7th, 8th and 9th, 9 a.m. - 12 noon: Meeting of the « Papers » Sessions.

Sunday, August 5th: Morning free. Sight seeing tours will be arranged for the afternoon.

Thursday, August 9th, 2:30 p.m.: General Meeting of the World's Poultry Science Association.

4:30 p.m.: Plenary (closing) Session.

Friday, August 10th, 7:30 a.m.: Departure of the five Post-Congress Tours.

SCIENTIFIC PROGRAM AND PAPERS

Five General Papers will be presented at the Plenary meeting arranged to be held from 9 a.m. to 12:30 p.m. on 3rd August.

The following classification has been arranged for the other papers which are to be presented at the Congress.

Section I: Genetics and incubation.

Section II: Nutrition, physiology and rearing.

Section III: Investigation of diseases and their control.

Section IV: Economic problems, including marketing.

Section V: Education and organization.

Each Section will have a President to preside at the daily meetings and a Secretary. All discussions will be translated into English and French.

ENTERTAINMENT

Particulars of the Excursions, Official Receptions and Evening Entertainments will be published in the Final Official Program which will be issued to members at the time of registration.

The French Committee has made elaborate plans for entertaining guests at the Congress. According to usual procedure, meetings will be held each morning of the Congress, and the afternoons are open for sightseeing, trips and social functions.

Alex Wiltzer, President of the Congress, has announced that the Paris tours during the Congress will include a visit to the Kings' Castle at Versailles, where the Congress members will be able to see the famous "Waterplays" show, a visit to the Fontainebleau Castle, as well as visits to extensive poultry breeding establishments.

Several parties have been aranged in Paris, including a party given over to the "Wines of France" and one given over to the "Perfumes of France." There will be a formal banquet at which Congress members will be the guests of the President of the French Republic. A special reservations and ticket office for famous Paris music halls, night clubs, and theatres will be at the Congress members' service.

POULTRY EXHIBIT

There will be a large live bird exhibit sponsored by the French Poultry Industry as well as other features depicting poultry raising in France. Manufacturers of incubators, feeds, equipment and supplies will show their products.

Visitors will find the live bird exhibit most interesting and instructive for it will contain breeds not seen in their country. As a matter of fact, there will be breeds shown there that many have never even heard of before.

INFORMATION

Information concerning Congress plans and details may be obtained by writing to the following: Mr. Alex Wiltzer, President, Ninth World's Poultry Congress, 28 Rue Bonaparte, Paris 6, France, or Mr. P. Waroquiez, Secretary-General, Ninth World's Poultry Congress, 12 Rue d'Armaille, Paris 17, France.

Members of the French Committee for the Ninth World's Poultry Congress visit the United States. Reading from left to right: M. Pierre De Montesquiou-Fezensac, M. Antoine Boudol, M. Alex Wiltzer (President of the Ninth World's Poultry Congress), W. D. Termohlen (President of the World's Poultry Science Association) and M. Pierre Hottinguer.

THE POULTRY INDUSTRY IN MOROCCO

MRS. P. BRENANS
Boulhaut par Casablanca, Maroc.

You ask for information about the Moroccan Aviculture. Very well. First of all, there is no aviculture in Morocco for the good reason that most of the breeding is carried on by the natives, which means Moroccans, and there are numerous disadvantages in their methods of breeding. I shall explain myself. I refer you to a short study that I requested from the Protectorate's Breeding Service:

"Aviculture, which has been practiced empirically in Morocco for about ten centuries before our era, has been playing an indispensable role in the country's economy. The egg and poultry business was always very active on the rural 'souks' (markets) as well as in the 'medinas' (cities) and also in the ports of exportation.

"As early as 1890, two English steamships used to come every month in Mazagan to load eggs from Doukkala. Soon, they were followed by Spanish sailboats coming from Cadix and Malaga. Since 1905, the French market has been opened to Moroccan eggs.

"Production for export has ups and downs, according to the circumstances, without ever stopping completely. The following, expressed in tons, shows this.

Year	*Exported eggs*	*Year*	*Exported eggs*
1912	4,711	1939	6,385
1913	3,125	1940	12,247
1914	952	1941	10,208
1915	2,955	1942	4,813
1920	4,233	1943	1,031
1925	10,365	1944	1,170
1930	9,883	1945	271
1935	10,430	1946	13
1936	10,193	1947	2,666
1937	9,886	1948	4,703
1938	6,277	1949	3,263

"Since June 1932, a Vizier's decree authorized poultry exportation which was forbidden up to then. Almost immediately a new trade was organized and was thriving, up to the last war, as the following figures demonstrate:

Year	*Live Poultry*	*Dead Poultry*
1933	6 tons	0 tons
1934	184	3
1935	226	31
1936	155	8
1937	109	33
1938	267	22

"Since the war, poultry exportation has been forbidden. I do not know the reason nor when this restriction will be lifted.

"This egg and poultry business, interesting from the economic point of view, should also be considered from the social point of view. Poultry, in Morocco, is indeed women's property. With the money they receive

from the sale of eggs and chickens, Moroccan women are able to buy in the 'souk' (local market) the articles needed for their toilet and housework, some little gifts for their children or some cheap jewelry which is their only luxury.

"The Moroccan hen, source of their income, like other countries' hens, comes from wild gallinaceous birds which still live in the tropical Asiatic jungles in India, in Burma, in Siam, and in the island of Sumatra. The wild cock, also called cock of Bankhiva, frequently mates with domestic-bred hens on the edges of the Laos' forests.

"It is quite difficult to describe the exact characteristics of the Moroccan hen. Its plumage, generally rather dull, often brown or tawny, varies from white to black, displaying all the blends of grey or reddish colors. The comb is simple, the ear-lobes are colorless and the wattles are average size; but the crested hens are not rare. Usually the eyes are chestnut color or black, and the legs and bills are black. The hen is light, with long legs, small head, long neck, narrow breast, slightly opened pelvis. It shows no precocity whatsoever. The weight of the carcass hardly goes over 1.4 kilos for the rooster and 1.2 kilos for the hen. The quality of the flesh is rather mediocre. Like all the domestic animals which live in Morocco, the hen which is small, is noted for its remarkable rusticity which enables it to live on what it can find around the 'douars' (villages) and the tents. In spite of its natural vivacity, it can stand to be tied to a peg and to travel head down, hung by the legs.

This hen lays, however, a good number of eggs as shown by the statistics of the export trade. It is even able to fatten when one is willing to give it the proper feed. The caponizing, which is practiced by old women according to very primitive processes, enables one to obtain very well developed birds with fleshy breasts, much more superior in meat to the skinny roosters usually offered on the markets.

"The hen, which is an excellent brooding-hen, lays dull white colored eggs—about 50 a year. The weight of one egg varies from 45 to 50 grams, whereas the average weight of an egg in France is 55 grams.

"The Moroccan hen has numerous enemies: animals of prey, parasites carrying the 'spirillose' (disease of the legs well known by all the Moroccan poultry-breeders) and especially many contagious diseases: cholera, diphteria and in the last few years plague which periodically ravages the poultry-yards. Unfortunately these diseases spread gradually by means of peddling.

"The improvement of such an interesting business has not been neglected however. Since 1934, the Cherifian Service of Control and Exportation checks the quality and the classification of eggs for export. These eggs have an excellent reputation on the European markets. The Breeding Service, which striving as much as possible to fight the different poultry diseases, tried by introducing selected breeds to obtain the bigger and slightly colored eggs as well as fleshier chickens preferred by foreign consumers.

"In 1930, an Experimental Poultry Center was created in Meknes. This Service sells from 10 to 20,000 eggs for hatching each year through the medium of the Prudential Native Societies and the Breeding Syndicates. These eggs come from breeds used to the climate of these regions. (Recently this service has been eliminated.)

"Poultry-breeders prefer larger sized poultry to the smaller Moroccan hens. The Leghorn, an excellent layer but with mediocre flesh indeed, the Black Bresse with a very well established reputation in France, did not have any success in Morocco because of their small size. On the other hand the Rhode-Island Red and the Light Sussex are very popular."

That is what Doctor Henry, veterinarian and principal inspector of breeding, told us. However this does not mean that I completely agree with him.

While studying U.S. Aviculture, I noticed in the statistics of the Poultry Branch of the Dept. of Agriculture, Washington, D.C., that there were approximately 60 million fowl in French

Morocco. I don't question the information sources of the U.S.D.A., but I would say . . . almost 50 million Arabian hens of the kind described by Dr. Henry. They are rustic indeed, small, laying a few small eggs; they are excellent brooding-hens with no standards. Their flesh is light weight and almost tasteless. How many so-called European hens are imported from France and elsewhere? 800,000 maybe? Who knows? . . .

Each year, whenever European poultry-breeders wish to establish flocks of pure or almost pure-breds, the prevalent Moroccan endemic diseases destroy the high priced birds. However, should there be a Poultry Dept. in the Breeding Service which didn't disregard 'pure-bred poultry', Morocco, with its wide spaces, its plentiful grain crops, its inexperienced but easily obtained and trained man-power, would be able to become a poultry-breeding country . . . if poultry-breeding was cared for, if peddling which spreads contagious disease from one end of the country to the other was limited, if we had a few veterinarians specialized in aviculture, if . . . But how many 'Ifs'! . . .

Considering everything, there are many problems to solve and it would be very possible to give them an answer. You wish to know the poultry-breeders' average state of mind?

If you asked one of these breeders, amateur or professional (very few among the latter) what they are thinking of Moroccan aviculture, the former will tell you that there are

Moroccan poultry merchants

too many diseases, the professional breeder will say that the official Services don't help poultry-breeding and that no specialized veterinary service exists in aviculture, like it does exist in any other foreign country. A third breeder will show you that poultry-breeding, done according to rational methods, does not pay and that it is better not to attempt anything or stick to the native breed such as it is. So many men, so many opinions . . .

For over a year I have been striving, through articles on aviculture published in the largest Moroccan daily newspaper (the "Vigie Marocaine" of Casablanca), to prove that we could have an aviculture in Morocco which would yield a good income. Assuming that the Arabian stock is superior in number to that of a few hundred of thousands imported pure-bred hens, it would nevertheless be possible to do good work, but first we must know all about the buiness and what we want to do. In my opinion, a large majority of modern poultry-breeders is greatly handicapped by lack of training.

Before ending this brief survey, here are excerpts from two letters (two articles published in the "Vigie Marocaine" of August 24 and 31, 1950) :

"Complaints from a Casablanca poultry-breeder. I always read with interest in the 'Vigie' your articles on poultry-breeding . . . As I am interested in this business, I would like you to tell me if you could ask the Public Works of Rabat to cut electrical power only half-days instead of full days so that it will not interfere too much with poultry-breeders using electrical machinery . . . etc. . ."

"I have been and still am so discouraged by poultry diphteria that I begin to wonder if all your articles about aviculture are worth reading. I doubt if you know that the municipality of Casablanca sets the price of poultry lower and lower: 160 frcs. a kilo for live poultry, 175 frcs. for dead and feathered poultry.

"The retail dealers are discouraged because for each fowl the waste amounts to 150 grams, which means 24 frcs. loss; that brings the kilo to 164 frcs. You don't protect us enough . . .

"For example, I have beautiful Faverolle hens which I am obliged to sell for 160 frcs. a kilo. In France they are sold for 600 frcs. a kilo. A distinction should be made between Arabian and high-bred poultry. You should take care of that, otherwise no French poultry-breeder will be willing to come and settle here . . ."

I answered this gentleman and it would be useless to give you the details of my letters. I have simply confirmed what I had written and repeated so many times in my articles, that is to say that we ought to create in Morocco a Poultry-breeders' Syndicate (high-bred or utilitarian stock breeders) and that it was a necessity for all the country's poultry-breeders to learn their trade other than by reading some vague magazines and by sticking to outmoded breeding conceptions. I also added:

"Believe me, there are more people than you think who are eating good chickens and . . . who are paying for them. Besides it would be a

paradox that an Arabian chicken, fed and raised according to the 'best modern methods of the natives', tied up to a stake of a tent in some deserted places, really being fed only after the harvests, would represent the same value as a well grain-fed chicken raised according to our scientific modern European methods. Don't be afraid, there still are in Morocco housewives who know chickens. Why do you lament over those 'poor' retailers and middlemen? Sell your chicken yourself if they are high quality chickens . . . There are in Casablanca some very reliable poultry markets which want to keep their customers and which will be very pleased to buy birds from you at remunerative prices, without trying to cheat you. Honesty is the best policy, believe me . . ."

"When Economic Services sets the price of chickens, it is certainly not for high quality chickens. We have in Morocco a strong Arabian competition. It is up to us to show the advantages of our products. For example, in Boulhaut where I live, it is locally well known that all Arabian chickens, and you should see their quality, are bought in large quantities by wholesalers from Casablanca or Fedala at prices which, in spite of everything, do not go lower than 150 to 200 frcs. How do the retailers handle the fixed price? It is the same story for eggs which are also bought by two Casablancan wholesalers at a price between 5 and 10 frcs. apiece, closer to 5 than 10. Certainly, "victory" reports from the official Food Services claim: "Chickens for 160 frcs. . . . a slight increase these last days because of the approaching holidays . ! . terrible! . . . 190 frcs. . . .

"My dear Sir, if you don't succeed, and you seem bitter, there certainly is a good reason for it and you should read carefully my very first articles. You will read that one should never give up in the poultry-breeding business and that one should take all the necessary precautions. I have even said that poultry-breeding didn't yield a good income immediately . . . and I am in a good position to know it . . ."

I have cited certain paragraphs of my two articles to show you the state of mind of Moroccans concerning poultry-breeding. I also wanted to point out to you that, for the great majority of them, ignorance of the business is the main trouble. I would also like to emphasize the strong competition of the Arabian chickens sold very cheap, and for a good reason, on all the markets in the country. Another thing is the almost total indifference of the official Services which do not recognize, like Dr. Henry (his survey dates from a few years back), the economical importance of stimulating and helping poultry-breeding like they do for any other breeding.

All over the country you will find this 'notorious' Arabian hen. It is a part of the Arab's or "chleu's" personal property. If you have the chance to travel through Morocco, you will quickly get a clear idea of how little they take care of it, even the women. Whether they are settled or semi-nomads, the natives think of their poultry only when the time comes to get money out of it. No care, no chicken coops, no adequate feed. In the middle of the fields, more or less parched by the sun, or among close-cropped stubbles of the last harvest, in the wood-cutting areas, in the middle of the glades, you will see the blackish domes of the tents or the sharp pointed tops of the "noualahs" (conic shaped huts made of reeds) and around these primitive dwellings, changing with the mind of their owner, a few small flocks of hens, roosters, chicks, hen-turkeys

and young turkeys . . . all of them pecking and scratching out whatever they can find . . . around the small dirt-built villages. The same birds move freely among heaps of rubbish, along the roads and ditches, without fearing the cars. Brooding-hens lay eggs and brood whenever they feel like it along a cactus hedge or at the boarder of a mimosa thicket. Sometimes they are followed by a flock of newly born little ones, where they were born only God knows! Look out for hawks, Jackals, hyenas and vipers . . .

Every week, the Moroccan woman catches as many as she can out of her little flock and goes to the "souk" located sometimes 10 kilometers away. Here she goes, riding her donkey, pounding its sides lightly with her bare feet, sometimes wearing her "babouches" (Turkish slippers), with her child strapped on her back. She takes along a few specimens of her open-air poultry-yard, 5 or 6 in a bunch hung by the legs, maybe one or two chickens weighing 500 grams at the most, one or two adult skinny roosters hardly weighing 1.3 kilos and also a few eggs picked up anywhere. She does not even know when they were laid.

All these people coming from all over the place gather on a fixed day in the "souks" of the region. (Natives are very fond of these Moroccan markets, even if they have nothing to sell): "Souk el Thonin" (Monday market, "souk el Arba" (Tuesday market), "souk el Khemis" (Thursday market), etc. . . "souks" for every day of the week. Morocco is full of them.

All these people jostle each other, pack together, spread all over, squeeze each other, go back and forth among a cacophony of screams and squallings, and finally settle down and exhibit whatever they have to sell. . . Here you'll find cattle dealers, there grain merchants, farther egg and poultry dealers, etc. . . . They bargain a lot like anywhere, but with more greediness, gesticulating violently, but without being dangerous. Any merchant is a sharp guy and any buyer believes that he himself is even sharper.

As far as I am concerned, after almost 16 years in Morocco, I can say that every time I tried to bargain I was cheated. I formed the habit of learning the prices in advance and buying calmly, if I am pleased, otherwise I go away without arguing.

There are two kinds of buyers in these "souks": First the country folks, Europeans or natives, and the outsiders that one knows well and who come from neighboring villages trying to sweep up everything at a low price, and then to sell their

loot to city wholesalers. In Boulhaut, they are mainly buyers from Casablanca who hold prices down and sweep up the market. They claim that they don't make any profit on the deal because the municipal Services set fixed prices for their products.

For example, according to them, a fowl bought for 180 frcs., barely weighing 1.3 kilos, does not net them anything after taking away the waste and the fee for plucking it (5 frcs. a piece). Better yet, many of the birds bought at the market don't reach the city. Many die on the way because they were sick when sold. A month ago I witnessed the following incident: An European woman attracted by a low priced hen-turkey which she planned to fatten for Christmas, arrived home with a corpse. Between the "souk" and the grocery store where I found her bewildered (600 meters approximately), the hen-turkey had passed away . . . Net profit! . . .

All these city wholesalers pile up their purchases on the top of their body-shaking Arabian trucks worthy of Dubout's comic strips. The tops are loaded with heterogeneous merchandise, people pile up one on top of another among goats, sacks of grain, baskets, screeching poultry. Everybody and everything is packed like sardines. The next day, one resells whatever is left to the wholesale dealer and one tries to recover one's investment with a profit.

They certainly make a profit, these perpetual complainers, otherwise they would give up their business . . . And you see them again and again in all the Moroccan "souks," every single day of the week, sometimes here, sometimes there, using the same methods and the same rather shaky mode of transportation.

These fowl and these eggs are resold, as I said, to wholesalers and the city merchants, the restaurant owners, the market retailers buy from them. The municipal Services then begin to act and naturally set fixed prices for these questionable products, otherwise . . .

How much did such a chicken or fowl cost the native woman? Nothing, since she considers it as a "gift from God". . . I understand the complaints of the Casablancan hard-working poultry-dealer concerning his Faverolles raised and fed the European way.

Prices change with the season, with the supply and demand. Let's see now some of Casablanca's market prices.

In the "Petit Marocain" of November 27, 1950, I read big subtitles: "New regulation concerning the egg business." The public Services and to be more exact the food Services were

at last stirred up by the successive and excessive increases noticed for a month in egg prices. After many and varied inquiries, they noticed that exportations were playing an important role in the local setting up of prices.

Lately, and in spite of a slight slump which occurred in the exportations, wholesale egg prices were set as follows: "selected eggs 1,500 frcs. a hundred, mixed eggs 1,000 frcs. a hundred." To cope with this situation the city Services contacted specialized organizations so that local prices might be brought back to a normal level, no matter how important the exportations might be. Therefore, from now on, Casablancan housewives will be able to buy eggs at the following prices:

"Selected eggs" ..... 12 frcs. apiece
"Large eggs" ..... 10 frcs. apiece
"Medium eggs" ..... 9 frcs. apiece
"Small eggs" ..... 8 frcs. apiece

Let's take up prices in the different city markets:

Bab Marrakech's market:
chicken 190-220 frcs. apiece; egg 10-12 frcs. apiece

Derb Sultan's market:
chicken 190-220 frcs. apiece; egg 14-15 frcs. apiece

Maarif's market:
chicken 220 frcs. apiece; egg 11-16 frcs. apiece

Peddlers' market:
chicken 220 frcs. apiece; egg 13-17 frcs. apiece

Liberté's market:
chicken 220 frcs. apiece; egg 10-16 frcs. apiece

Roches Noires' market:
chicken 220 frcs. apiece; egg 12-15 frcs. apiece

Let's read the "Petit Marocain" of December 2, 1950: "The Administration must stop increases in poultry prices before the coming holidays." Poultry prices seem to be stabilized at a level which does not please housewives as a whole too well. Many explanations were given to us. One of them does not satisfy us entirely because it involves poultry-breeders who "eat purely and simply all the products of their breeding to avoid buying high priced meat in the markets." (How beautifully presented! . .)

It seems to us that such a reasoning is not sufficient to justify the actual price of a chicken or a rabbit. Many other causes are responsible for this increase, primarily this business of the middleman between consumers and producers. (Refer to the complaints of a Casablancan poultry-breeder previously given.)

Let's see the market prices and let's compare them to those previously given:

Derb Sultan's market:
chicken 190 frcs. apiece; egg 12-15 frcs. apiece

Maarif's market:
chicken 220 frcs. apiece; egg 11-14 frcs. apiece

Chaouia's market:
chicken 220 frcs. apiece; egg 8-13 frcs. apiece

Liberté's market:
chicken 220 frcs. apiece; egg 6-12 frcs. apiece

Bab Marrakech's market:
chicken 220 frcs. apiece; egg 8-13 frcs. apiece

Roches Noires' market:
chicken 220 frcs. apiece; egg 10-13 frcs. apiece

Lafayette's market:
chicken 220 frcs. apiece; egg 8-12 frcs. apiece

Are you satisfied? But you should see the eggs and the fowl and then, you would understand quickly why they seem to be sold so cheap! . . For all the money in the world, I would not like to eat such eggs, and what about their freshness! . . .

But after all, there should be things for any taste and any purse . . .

What does one do to guarantee cleanliness and "health" of these eggs? I know absolutely nothing about it . . . , for the moment at least. The city's veterinary Services are about to take care of this matter. That remains to be seen.

A Moroccan egg dealer

Good eggs like one finds in France or elsewhere are sold at prices ranging from 20 to 23 frcs. apiece, but certainly not in the markets. That's normal.

Let's go back to our "souk" in Boulhaut. All the Arabian markets look alike, except for the place where they are held. We have questioned some officers in charge of the egg and poultry business. Don't think that all the products of the region are sold in this "souk". Only a very small portion of them is sold there.

Since we have fixed prices in Boulhaut too, ¾ of the eggs and fowl are bought in the country. Buyers more or less clever, independent or hired by different specialized firms, comb farms, visit "douars" (Arabian villages), tents, etc. . . They pay cash and are able to impose their own prices because most of the time the Moroccan woman does not know a thing about it. They sweep up everything they can, pile up the products along the roads and take poultry and eggs to Casablanca or any other city. The same more or less shaky trucks, sometimes new ones, unload their whole cargo on the wholesale markets.

Now you know about these middlemen. That is why I repeat again and again what I have said and written so many times: As long as the poultry-breeders will not form a syndicate as is done anywhere else, poultry products will be of very poor quality and will be expensive; that goes for the natives' products. Now, the excellent European breeders' products will be more than once extremely handicapped by such competition.

You might wonder then what happens in this mess to the genuine high-bred poultry, Bresse, Gatinais, Wyandottes, etc. . . Well, none appears on the markets' counters, and for a very good reason. They are certainly worth more than 220 frcs, 195 frcs at the present time. They are sold downtown through the medium of food concerns, butcher shops, etc. . . for very reasonable prices.

I am sure that the day will come when some European poultry-breeders will decide to run their business in a modern way, as I tried to do, knowing their trade perfectly well and also the peculiar Moroccan situation. Having sufficient capital to get industrialized, they will be able to produce plenty of highly-bred poultry. Then these same poultry-breeders, united in a poultry cooperative, will become masters of Moroccan interior trade and export. There is plenty of room for development.

HEAT TREATMENT KEEPS EGGS FRESH

H. E. GORESLINE
U.S. Dept. Agriculture, Washington, D.C.

You're wrong if you think that the only time an egg ought to be heated is when it is cooked or incubated. For over a century it has been known that a certain heat process would preserve an egg's freshness. A recently tested variation of this process called "Thermostabilization" indicates that it has definite commercial possibilities.

Actually, thermostabilization is simpler than it sounds. It means that a substance, in this case, an egg, is subjected to moderate, controlled heat—enough to bring about a slight physical, but no chemical change. The result is an egg resistant to the normal deteriorative changes which occur in storage.

A TWENTY-SECOND EGG

Early accounts of the process reveal a number of variations in the application of heat. Records over 100 years old tell of preserving eggs by "dipping them for twenty seconds in boiling water, and then keeping them well dried in finely sifted ashes." Other sources of the same period refer to a repetition of the momentary hot bath several times, after which "the eggs were placed, small end down, in bran, salt or oats." This, it was noted, kept them "perfectly fresh and good."

By extending the time and lowering the temperature, Professor E. M. Funk of the University of Missouri developed the basic process tested in recent studies by the U. S. Department of Agriculture. This work has been performed under authority of the Research and Marketing Act of 1946. In these experiments a heated, flowing film of oil was used, after which the eggs were placed in normal cold storage. There have been other refinements such as oil temperature control to within 1°F. of a constant, and precise measurement of exposure to this heat. The substitution of oil for water was a logical move, since oil-treating of shell eggs is commonly practiced to preserve quality and improve appearance, and both operations could be carried out at once at little added cost. Results of the work were reported at the 1950 annual meeting of the Institute of Food Technologists.

IMPRESSIVE SAVINGS APPARENT

On the basis of tests involving about 400 cases of eggs,

considerable savings appear possible in terms of both dollars for egg processors and quality for consumers. While savings were indicated in a number of ways, perhaps the most positive evidence appeared in measuring the quality loss in storage in terms of U.S. Grade. These tests were performed with eggs which were uniformly U.S. Grade A at the outset. Some received no treatment, others were oil processed, and a third group was thermostabilized for 16 minutes at various temperatures ranging from 130°F. to 139°F. The results for thermostabilization show a range of 46.7% to 62.5% Grade A eggs remaining after 8 months storage with an average, for all temperatures of stabilization, of 54.9%. By contrast, the untreated eggs had a retention of 1.7% Grade A after 8 months, while the oil processed eggs showed 42.2% Grade A after storage of the same duration.

In these tests, the quality of "naturals" declined rapidly and oil processing markedly retarded this decline. While a lack of consistency in results was noted for eggs stabilized at 134°F. and stored for 5 months, the over-all results showed that stabilized eggs retained quality to a higher degree than oil-processed eggs. Quality loss in untreated eggs was strikingly greater than that of those oil-processed or stabilized.

CHECKED THINNING OF EGG WHITE

The reduction of quality loss, translated into physical changes within the eggs, has meant that stabilization prevented the normal deteriorative thinning of egg white during storage. Thermostabilization increased the albumen index, and it remained higher during all storage periods than the indices of "natural" and "oiled" eggs. Finally, there was considerably less moisture or weight loss in the thermostabilized eggs than in untreated eggs.

Further studies of the process to be completed in December will help to determine the status of stabilization in commercial egg marketing. Established thus far are the low cost and the speed with which the process can be performed—in addition to the real promise offered on the basis of the first round of substantial testing.

Fuller reports will be made available later, both on the completed studies and the work under way. These will be released by the Production and Marketing Administration of the U.S. Department of Agriculture. (Marketing Activities, PMA, U.S. Dept. Agr.—September 1950).

COMPARATIVE MASH CONSUMPTION, GRAIN CONSUMPTION AND FEED EFFICIENCY OF BROAD BREASTED BRONZE AND BELTSVILLE SMALL WHITE TURKEYS

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In an attempt to obtain information on comparative feed requirements and efficiencies of these two varieties of turkeys, a survey was made for existing data, with practically no results. To make such data available, flocks of several thousand B.B. Bronze and one flock of several thousand Beltsville Small White turkeys were raised on The Grange Company Experimental Turkey Farms during 1949 and 1950. The birds were started and reared under the same management and practical feeding program of mashes and grain. In the latter half of the rearing period the flocks were divided into smaller groups which were given different kinds of grains. There were differences in economy and feed efficiency due to the different grains, but these variations were applied about equally to the two varieties of turkeys, and are believed to represent what the turkeys might commonly encounter under usual commercial conditions. Accordingly, only the average data for the two varieties will be presented. It is emphasized that these data do not represent only the very best results but are a composite of all results from the different grain feeding programs. Furthermore, they are an accurate summary of the performances of the flock studied, but are not presented as necessarily typical of these varieties.

In the first figure are shown the comparative growth curves of the two sexes of each variety, expressed as pounds at indicated ages in weeks. Both varieties from which data were taken for this report pursued very uniform and characteristic growth curves, without serious disturbance from disease, or any other cause. This, of course, is very important if the varieties are to be compared at all.

The second graph shows the manner in which the turkeys selected mash and grain as they became older. While there was no restriction on the availability of mash and grain to these birds, they show in their choice of feed a definite and consistent behavior. The mash intake curves greatly resemble the growth curves given in the first figure, both as to shape

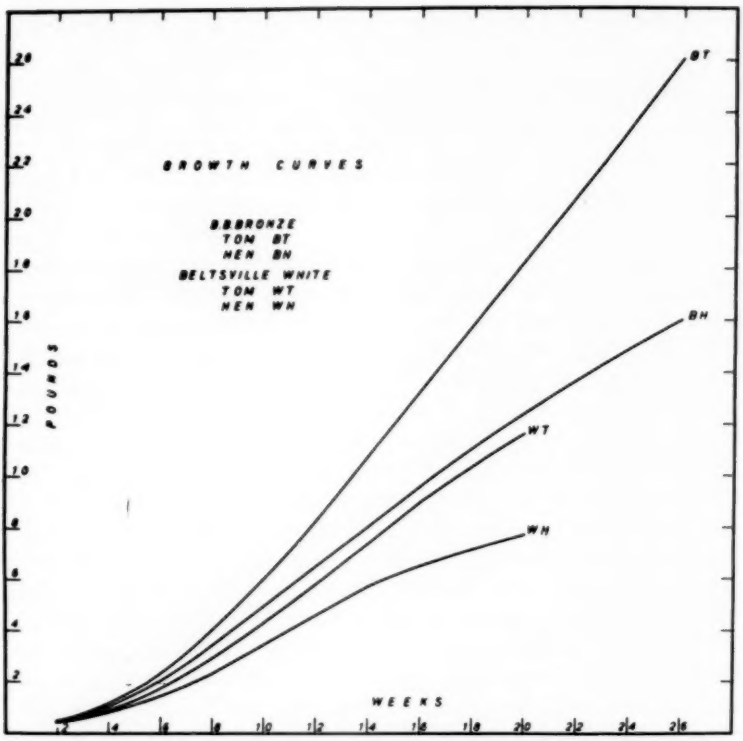

Figure 1. Growth curves of Broad Breasted Bronze and Beltsville Small White Turkeys.

and spread. On the other hand, the grain intake curves of hens and toms of the two varieties are surprisingly similar and exhibit relatively little spread.

The mash intake curve, especially of the toms, shows little indication of appreciable tapering off as the turkey becomes older. This seems to be contrary to popular notions, but is an established fact. The grain intake curve for older turkeys shows a fairly rapid rate of increase. Evidently, the turkey will not voluntarily decrease its mash intake as long as it is still trying to grow, but will increase grain intake, and, hence, the percentage of grain in the total diet, in the latter stages of growth. The grain intake may be most closely related to heat and activity energy requirements of these birds.

The third figure shows mash and grain intake in a different manner, that is in relation, not to age, but to turkey weight. This manner of looking at the data is perhaps the sounder

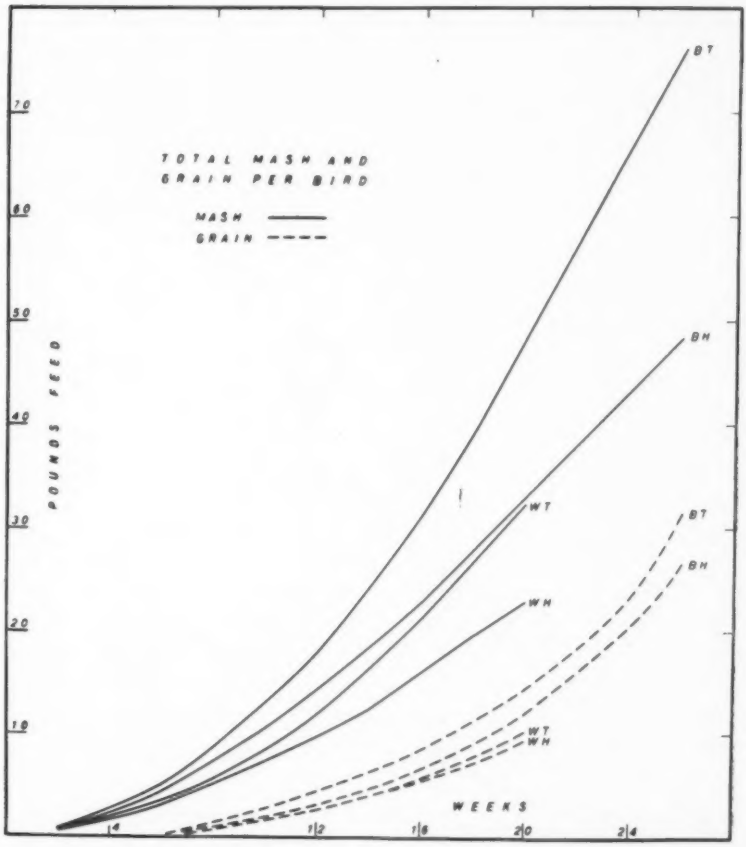

Figure 2. Cumulative mash and grain intake curves of Broad Breasted Bronze and Beltsville Small White Turkeys.

method because birds of the same weight are more nearly equal physiologically than may be the case among birds of the same age. This figure brings out clearly that the mash intake in relation to turkey *weight* starts out and proceeds for some extent on an identical basis *irrespective of sex or variety.* This is evidence of an underlying influence of a fundamental nature. The increase in weight of young animals is primarily growth of new tissues, and the composition of the tissues of either sex or variety is undoubtedly identical in the early stages of growth. For this reason the pounds of mash, which contains the growth nutrients, turns out to be practically identical per pound of turkey, regardless of kind of turkey. The grain intake

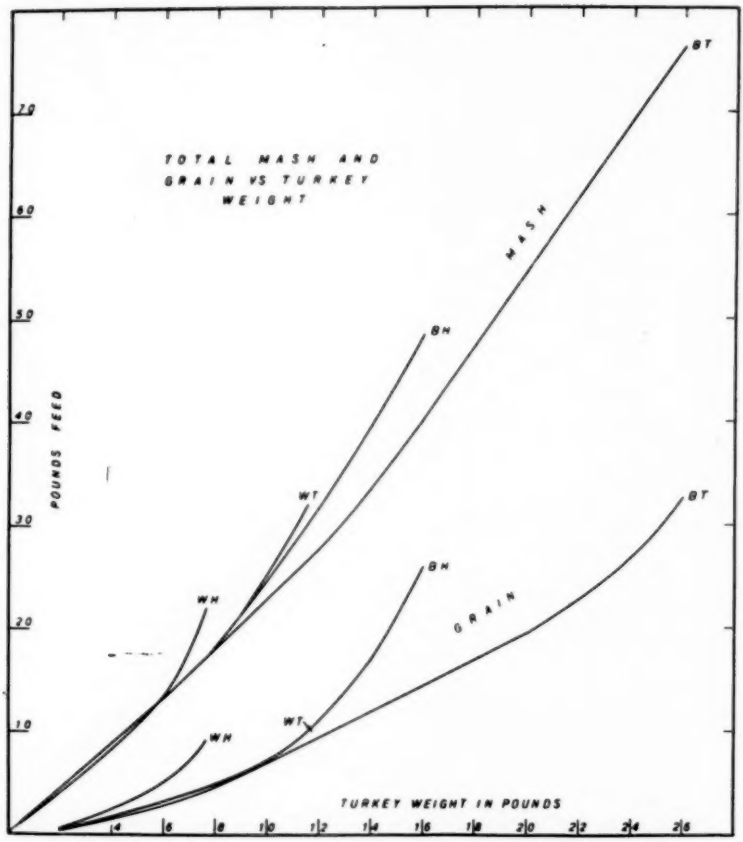

Figure 3. Cumulative mash and grain intake as related to weight of Broad Breasted Bronze and Beltsville Small White Turkeys.

curves, like the mash curves, indicate a great similarity among the kinds of turkeys, which can only imply, once more, that there is some sort of fundamental control in operation.

It is to be noted that as each kind of turkey begins to approach adult weight the mash and grain intakes for each show a relative increase per lb. of turkey. Particularly striking is the continued and straight line mash intake of the Bronze tom, and the rapid upswing in the case of the White hen. It is of interest also, that the Bronze hen and the White tom, which are of nearly the same size, tend to remain close together in feed selection over most of the growing period.

In the fourth figure are given the feed efficiencies of these turkeys as related to turkey weight. The cumulative feed

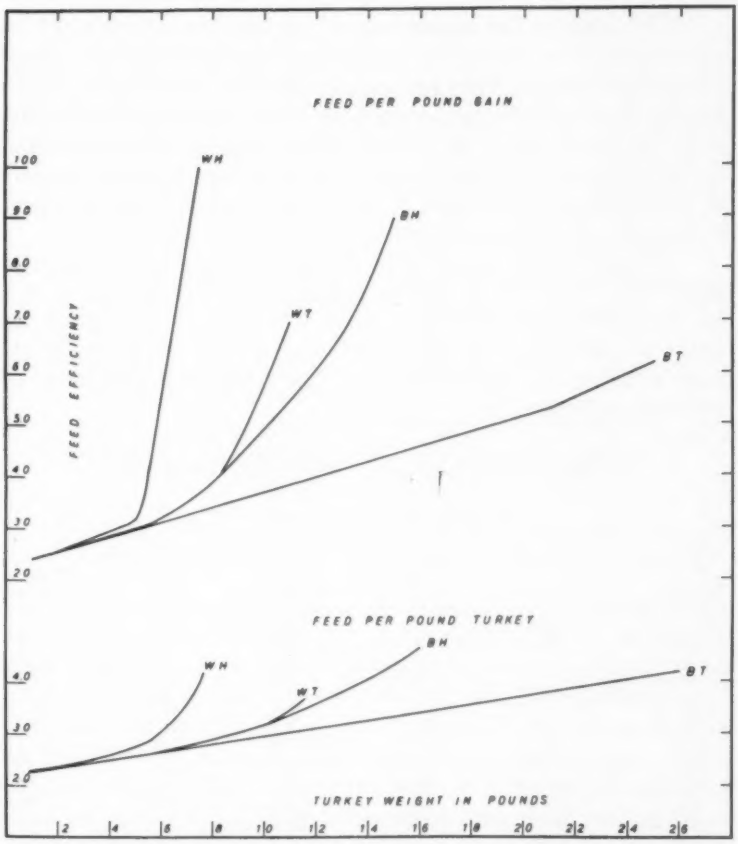

Figure 4. Feed efficiency as related to weight of Broad Breasted Bronze and Beltsville Small White Turkeys.

efficiency, that is, total lbs. of mash and grain consumed per turkeys divided by live weight of the bird, is the one most commonly used and is given at the bottom of the figure. As will be seen, the comparative feed efficiencies of the four kinds of turkeys starts out and remains for some time on a practically identical course. The different birds deviate from this course as they separately begin to approach their respective adult weights. This manner of representing data shows approximately where each bird begins to lose efficiency as a feed convertor, but is far less sensitive in this respect than the method of indicating feed efficiency as given on the upper half of the same figure.

The lines on the upper half of the figure represent the instantaneous feed efficiency as related to weight of bird. These lines show exactly what the immediate feed conversion of any bird is at any particular weight, without inclusion of the feed that has been eaten to achieve that weight. The particular value of this part of the figure is to bring out sharply the point at which the turkey begins to lose feed efficiency and at which it becomes no longer economical to feed the bird.

Of course, the point of disadvantageous economy will depend upon feed prices, turkey prices and other factors as well as feed efficiency. However, once the bird has reached the point of sharp loss of feed efficiency, the grower should get busy with his pencil and begin to figure his costs and probable returns very closely.

BROAD BREASTED BRONZE TURKEY

Average data for mixed sexes

Age in Weeks	Weight	Mash to date	Grain to date	Total Feed	Feed Efficiency*
	lbs.	lbs.	lbs.	lbs.	
2	0.49	0.7	0.0	0.7	1.42
4	1.15	2.5	0.0	2.5	2.18
6	2.15	4.7	0.3	5.0	2.33
8	3.70	8.1	1.1	9.2	2.49
10	5.45	11.8	2.3	14.1	2.58
12	7.40	16.3	3.8	20.1	2.71
14	9.40	21.6	5.3	26.9	2.86
16	11.42	27.2	7.7	34.9	3.06
18	13.38	33.6	10.2	43.8	3.27
20	15.35	40.7	13.2	53.9	3.51
22	17.30	48.0	16.2	64.2	3.71
24	19.20	55.4	22.0	77.4	4.03
26	21.00	62.5	29.0	91.5	4.36

BELTSVILLE SMALL WHITE TURKEY

Average data for mixed sexes

Age in Weeks	Weight	Mash to date	Grain to date	Total Feed	Feed Efficiency*
2	0.40	0.6	0.0	0.6	1.50
4	0.85	1.8	0.1	1.9	2.24
6	1.58	3.3	0.5	3.8	2.40
8	2.60	5.3	1.1	6.4	2.46
10	3.82	7.9	1.9	9.8	2.56
12	5.13	10.9	2.9	13.8	2.69
14	6.50	14.3	4.3	18.6	2.86
16	7.72	18.7	5.7	24.4	3.16
18	8.80	23.4	7.7	31.1	3.53
20	9.66	27.6	9.9	37.5	3.88

*Total feed eaten divided by weight of bird.

In the final table are given comparative weekly mash and grain intakes and feed efficiencies for Bronze and Small White turkeys in flocks of mixed sexes. As made evident in the preceeding discussion, the feed conversion of these two varieties is very similar until the point is reached at approximately 14 weeks when the White hen begins to lose feed efficiency very rapidly.

THE EFFECT OF ENERGY LEVEL OF STARTING AND GROWING RATIONS ON THE PERFORMANCE OF LAYING HENS

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Western Washington Experiment Station, Puyallup, Wash.

Three rations varying in energy level according to the content of corn, oats, barley, millrun and dehydrated alfalfa have been compared as starting, growing and laying diets for range and confinement raised White Leghorn pullets.

Energy level of the growing diets did not affect the age at maturity of range pullets. Groups of confinement reared birds fed the higher energy rations to eight or 22 weeks of age matured at the same time, and one week earlier than groups of birds fed lower energy rations for the entire growing period.

Pullets raised on the higher energy levels weighed more at maturity; however, they gained less during the laying period of the experiment.

Egg production averaged higher for the range reared, low energy fed lot than for the range reared, high energy fed group. With the confinement reared birds, no difference existed between the birds fed the low, medium and high energy rations, but the rate of lay of the group started on high energy and shifted to the low energy ration at eight weeks of age slightly exceeded that of these three groups.

The energy content of the growing and laying rations had no effect on egg weight or hatchability. Cannibalism mortality was higher and feather picking more in evidence on the birds fed the higher energy diets. (Abstract—Poultry Science 29: 748, 1950.)

INTENSIVE FLOOR BROODING FOR BROILERS

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Great progress has been made during the last 20 years regarding production of broilers and fryers. It is the purpose of this article to show to what extent, modern developments have improved the industry's methods of growing broilers.

The man who wants today to enter the business of broiler growing has to decide whether to take up range, battery or intensive rearing. There is unfortunately too little literature to help him to solve this most important problem, while advice is not always sought. Also, the question is not yet settled on which one amongst those three methods is the most efficient. According to many, this would vary with local conditions. This however is doubtful and should be proved by further experiments.

There is indeed a growing need for such experiments which should show definitely how to grow best table chickens and should form a "standard method of broiler growing." It would avoid losses to the beginner and would be of help to all broilermen. Very likely, there really is a best way to grow chickens, whatever local conditions may be. That method should then be made widely known.

The advantages and disadvantages of various systems are briefly as follows:

Range Growing—In this method, chicks are allowed to run on grass from about a week old to marketing time. The advantages of putting birds on a *good* range are obvious, namely fresh air, sun, green-stuff and lower mash consumption per day. However, growth is slower and labor costs higher. Also, mortality may occur from foxes, dogs, coccidiosis and other causes. Colds are common.

Battery Growing—Batteries usually give a steady growth. In some makes of battery-brooders, on the other hand, coccidiosis is of frequent occurence, due to faulty design. If not given well balanced feeds, battery chickens will rapidly develop deficiency diseases. Furthermore battery brooding is not labor-saving, at least for some makes, and requires a large investment of money.

Intensive Floor Brooding—Intensive brooding has been widely used, chiefly for starting chicks up to 2-4 weeks. But now intensive brooding is also used for broiler production, chiefly in the United States. The convenience of the system is shown by the facts that feather picking and cannibalism

can be better controlled than in batteries, there are few or no breast blisters and management can be made very labor-saving. Growth is at least as good as in batteries and faster than on range. Capital outlay is smaller and brooder houses can easily be converted into laying houses.

Infra-red brooding and built-up litter have further increased these advantages.

There are still many poultrymen, particularly in France, who prefer batteries, while in England, range is widely favored. There is no sound reason why intensive brooding should not be successful here and there. The fact is that a large number of poultry-men do not yet know enough about these new systems and there would be great use in popularizing built-up intensive floor brooding for broilers.

In countries where the weather is very cold, very hot, damp or unsteady or where the soil is poor, intensive brooding should be tried.

It is the opinion of the writer of this article after fair trials of all these systems, that intensive floor brooding has a great future.

POULTRY RAISING FOR TABLE USE DEVELOPING IN AUSTRALIA

Poultry raising for table use is developing into an important industry in Australia. The greatly increased demand from the United Kingdom since 1946 and the relatively high prices paid for poultry have been contributing factors in the growth from what until recent years was considered a side line of egg production into an important branch of farming.

Export figures show the increasing quantities of Australian poultry for table use which have been sold during the past several years. Even though United Kingdom trade preference is changing from broiler fowls to prime chickens and turkeys, there is a strong demand for birds of all classifications for both the local and the export markets in the current season.

AUSTRALIAN EXPORTS OF POULTRY

Classification	1938-39 *Thousands*	1947-48 *Thousands*	1948-49 *Thousands*	1949-50 *Thousands*
Ducks	5	184	280	540
Fowls	15	3,307	4,394	4,905
Turkeys	23	248	305	320
Other poultry	1	2	7	7
Total	44	3,741	4,986	5,772

(Foreign Crops and Markets, Foreign Agricultural Relations, U. S. Dept. Agr.)

PRESERVING POULTRY MEAT

CARBON DIOXIDE GIVES LONGER STORAGE LIFE

The Iowa station has been conducting studies on the preservation of cut-up eviscerated chickens at refrigeration temperatures above freezing. Bacterial counts on commercially processed cut-up birds are commonly very high, more than 100,000 bacteria per square centimeter of surface area not being unusual. The characteristic bacterial slime developing on dressed poultry consists largely of closely related species of *Pseudomonas*. These organisms are capable of comparatively rapid growth at refrigerator temperatures and show appreciable multiplication even at 0° C. It was found that storage in an atmosphere of carbon dioxide for a brief initial period would give pieces of chicken a longer over-all storage life than that of similar pieces stored only in air. With this treatment, growth of aerobic bacteria is checked. The maximum practicable CO_2 concentration that could be used in the storage of cut-up poultry was about 25 percent; higher concentrations caused rather rapid discoloration of muscle tissue. Short-time CO_2 storage might be used to advantage in the shipment of meats and meat products from the plant to the retailer or distributor.

WRAPPING POULTRY TO PREVENT DEHYDRATION

Because frozen poultry suffers a loss through dehydration, commonly referred to as freezer-burn, methods of prevention of this loss and deterioration in qualtiy are needed. The Minnesota and Indiana stations have been working on this problem. Minnesota has packaged dressed, eviscerated chickens in several types of commercial wrapping materials including locker paper, aluminum foil, laminated foil, cellophane sheets, pliofilm sheets and bags, Cry-O-Vac bags, Traver bags, and poultry boxes. Some carcasses were given a special ascorbic acid treatment to study its anti-oxidative effect; others were treated with ascorbic acid and a new anti-oxidative material, Krim-Ko-Gel. These birds were frozen soon after evisceration and stored under commercial frozen conditions for future physical, organoleptic, and chemical tests. According to results reported thus far the carcasses in the locker paper showed considerable freezer-burn; whereas those in pliofilm and aluminum foil were judged "very good."

The Indiana station has tried to preserve chickens in storage by applying a uniform film of polyvinyl alcohols (Elvanol) over the surface of the carcasses prior to storage.

Although the film retarded freezer-burn to a slight degree, it was found not too satisfactory for retarding dehydration of poultry over long periods of time (periods over 60 days). (Office of Agricultural Experiment Stations, U.S. Dept. Agr.)

FOLIC ACID AND UNIDENTIFIED FACTORS

In a study by the Maryland station on the nutritive requirements of poultry, it was found that a level of folic acid of from 26 to 34 micrograms per 100 grams of diet is required for normal hatchability of eggs. The 26 micrograms are adequate for normal production and fertility. Although no apparent differences were observed in down color and weight at hatching time of progeny as a result of low folic acid content of the maternal diet, the rate of growth, the degree of abnormal feather pigmentation, and the incidence of faulty feet structure of such progeny were influenced greatly by a lack of this factor. From this study it appears quite possible that folic acid deficiencies may occur under certain practical conditions. In the work on the multiplicity of unidentified B-complex vitamins, at least one unidentified factor was strongly indicated. This unidentified vitamin is required for rapid chick growth and is present in liver and dried whey but is not identical with vitamin B_{12}.

The Indiana station has shown that condensed fish solubles contain an unidentified growth factor or factors which stimulates growth in chicks and rats and is distinct from all identified vitamins. In studies to isolate this factor it was found that the factor is soluble in water, in ethanol, and in mixtures of acetone, ethanol, and water; is insoluble in ether and chloroform; is not adsorbed by fuller's earth; is readily adsorbed by and eluted from Florisil; and is not precipitated by lead. A concentrate was prepared which was active at a level of two parts per million in the diet.

This factor is distinct from vitamin B_{13}, and there is some evidence that it is also distinct from vitamin B_{12} and other postulated growth factors. Work is now in progress to further characterize this factor, both chemically and biologically, and to determine its relationship to the so-called animal protein factors. (Office of Agricultural Experiment Stations, U.S. Dept. Agr.)

TURKEY RESEARCH

Turkey production is a farm enterprise that is particularly sensitive to technology. Important research is going on in such fields as breeding, feeding, and marketing of turkeys. Many turkey growers are cooperating with the Register of Merit and Register of Production phases of the National Turkey Improvement Plan sponsored by the Department of Agriculture. Modern slaughter, cooling, and dressing methods are making it possible for turkey growers to market their birds to advantage in and out of season.

STILL-AIR INCUBATORS FAVORED FOR TURKEY HATCHING

The New Jersey station last year carried on research to determine whether turkey eggs could be hatched successfully in forced-draft incubators. Station workers recorded observations on five hatches. On the twenty-fourth day they divided the fertile eggs from each hen so that half of them might be hatched in a forced-draft-type machine and the other half in a still-air hatcher. The still-air-type incubator showed considerable advantage over the forced-draft machine. There was, however, no difference in viability of poults hatched from either group. In this research solid-top pedigree baskets were also found much safer than pedigree baskets with wire-mesh tops.

BROODINESS REDUCED IN BRONZE TURKEY HENS

The North Carolina Station, through application of genetic principles in the breeding and selection of Bronze turkeys, has reduced the period of broodiness in turkey hens from 14.5 percent in 1942 to only 5.5 percent in 1948. The number of hens showing neither pauses over 5 days nor broodiness during the lowest year was 25.2 percent. In 1948 it was 65.7 percent. Mortality for the first 6 months of the life of poults was reduced to 8.98 percent in 1948; of laying hens to 3.3 percent. The research also has resulted in improving materially the body types and laying performance of the strain. The percentage of young hens qualifying for the United States Register of Production was increased from 71.3 in 1943 to 79.3 in 1948. The project also revealed the statistical probability that only in 1 year out of 5 could North Carolina growers expect the maximum hatchability to fall before March 10 or after April 29. The most probable average date for maximum hatchability was April 4.

CORN AND SOYBEAN-OIL MEAL IN TURKEY RATIONS

In experiments at the Indiana station with turkeys raised in confinement, 25-percent-protein starting rations containing as much as 40 percent of yellow corn and 47.5 percent of soybean-oil meal, with no animal protein feeds but supplemented with minerals and vitamins, produced as satisfactory growth during the first 12 weeks as a ration containing meat-and-bone scraps and dried milk in addition to soybean-oil meal. From 12 to 28 weeks a 17-percent-protein all-mash growing ration containing 64 percent of yellow corn and 24 percent of soybean-oil meal with alfalfa meal, dried fermentation solubles, and minerals produced practically the same rate of gain as a ration with the same protein level containing both meat-and-bone scraps and soybean-oil meal.

These results show that yellow corn and soybean-oil meal, both of which are readily available in Indiana, can be used to make up almost 90 percent of the ration for turkeys raised in confinement. For turkeys on good pasture these two ingredients could comprise almost 95 percent of the growing ration since only minerals, in addition to the green feed, would be needed as supplement. The results of these trials also show that good turkeys can be produced without feeding oats, provided the corn is ground and fed in an all-mash ration in order to make the turkeys eat it during hot weather. (Office of Agricultural Experiment Stations, U.S. Dept. Agr.)

BREEDING FOR BROILER PRODUCTION

The poultry industry has paid particular attention in the past few years to research dealing with the development of more efficient broiler-type strains of chickens. National interest has been stimulated in this problem during the last 3 years by the "chicken of tomorrow" contests, sponsored by a national food distribution chain and carried on cooperatively by poultry producers, State extension services, State experiment stations, and the Department. Experiment stations have concentrated their efforts on developing specialized broiler-type strains of birds. In the selection of strains and in the crosses made, emphasis has been placed on growth rate, feed efficiency, feathering rate, amount of breast and thigh fleshing, and level of egg production in the parent stock.

BARRED ROCK BROILERS IN DELAWARE

The Delaware station reports research with Barred Plymouth Rocks in which meat-type matings produced the most desirable and efficient meat-type chicks. Preferential matings of egg-type males and meat-type females within the breed gave more desirable offspring for meat purposes than did reciprocal matings. The studies showed that inherent differences in efficiency of feed utilization exist and that a high efficiency apparently is associated with rapid rate of growth. Numerous factors controlled rate of growth inheritance.

POOR FEATHERING ELIMINATED IN MISSISSIPPI STRAIN

The Mississippi station reports success in its efforts to eliminate poor feathering in its strain of New Hampshire broilers. Baby chicks and hatching eggs have been released in the State for use in comparative breeding.

EARLY-FEATHERING BROILER STRAINS IN OKLAHOMA

Early-feathering strains of broilers were not available in Oklahoma until a few years ago. This lack forced Oklahoma poultrymen to buy out-of-State chicks at an additional cost of approximately 6 cents per chick marketed as broiler. This additional expense over the past 7 years has been estimated around $206,960. The Oklahoma station has developed early-feathering strains of White Plymouth Rocks, Barred Plymouth Rocks, White Wyandottes, and New Hampshires. Eggs from these birds have been distributed to the various hatcheries in the State so that any farmer can secure rapid-feathering stock.

BREEDING OF UNIFORMLY DRESSED CARCASSES

In 1948 broilers contributed over $18,000,000 in gross profits to the poultry industry in North Carolina. Poultrymen in the State appreciate the contributions of their station toward making such income possible. The North Carolina station has made special efforts to develop strains of New Hampshires and Barred Plymouth Rocks that would yield high-quality and uniformly dressed carcasses. Last year there was a difference of 0.7 pound in weight between the highest and lowest rating strains whose body weight was taken at 12 weeks of age. These strains had been taken from the same hatches, fed the same feed, and managed in the same manner. On the basis of 1,000 broilers, a farmer who selected the highest rating strain by weight for broiler production, would

have 700 more pounds of meat to market at 12 weeks of age than if he had chosen the lowest rating strain.

CROSSBRED BROILERS

The Arkansas station found that a cross of White Wyandotte cocks and New Hampshire hens gave offspring that weighed an average of 3.46 pounds at 12 weeks, a heavier weight than that of any of the other birds studied, including popular strains of purebreds in the stock. Information resulting from this research has been responsible for the present wide use of the White Wyandotte (male) × New Hampshire crosses in the broiler industry. Last year gross sales in broilers and hatching eggs amounted to at least $3,000,000. The cross is increasing in every major broiler area in Arkansas and is primarily responsible for the encouragement of hatchery supply flocks in the State. (Office of Agricultural Experiment Stations, U.S. Dept. Agr.)

LIBERIAN POULTRY SITUATION

Although poultry numbers in Liberia in 1950 increased about 10 percent above 1949 levels, poultry products continued short of demand. During 1950 about 1,000 dozen eggs and about 4,000 pounds of dressed poultry were imported from the United States to supplement local production.

The increase in flocks during 1950 is largely attributed to the poultry program of the Liberian Department of Agriculture and Commerce in cooperation with the United States Economic Mission. In 1949, R.O.P. New Hampshire Reds, Barred Plymouth Rocks, and White Leghorns were imported from the United States. From the 1950 hatchings of these birds, more than 5,000 day-old baby chicks were sold to farmers at nominal prices. About a third of these chicks came into production before the end of 1950 and large size eggs laid by some of them were sold in quantity for $1.00 per dozen during the holiday season. The interest aroused by comparison of these large eggs with the undersized native eggs is expected to stimulate poultry production further in 1951.

If the hatching program continues at the present rate, poultry production should be equal to demand within the next two years. (Foreign Crops and Markets, Foreign Agricultural Relations, U. S. Dept. Agr.)

THE PRACTICAL USE OF AN ALL-PLANT RATION FOR STARTING AND BROILER CHICKENS

G. M. BRIGGS, E. G. HILL and M. J. GILES
University of Minnesota, St. Paul, Minn.

A low-cost all-plant ration composed chiefly of corn and soybean oil meal has been used with success for starting and broiler chickens under laboratory and commercial conditions. The ration has the following formula in pounds per 1000: finely ground corn, 600; soybean oil meal, 350; bone meal or equivalent, 25; ground oyster shell or equivalent, 15; iodized salt, 10; 400D-3000A feeding oil or equivalent, 2; and manganese sulfate, 0.3. Each 1000 pounds also contains 1500 milligrams of riboflavin and 7.5 milligrams of vitamin B_{12} which are supplied by a riboflavin concentrate and APF supplement, respectively.

Leghorn and New Hampshire chickens fed this ration grew at normal rates and utilized their feed very efficiently. The ingredients are inexpensive and the ration is relatively easy to mix. It lends itself readily to home mixing and custom mixing, especially with the present availability of vitamin premixes on the market and the large supplies of home grown corn.

Although it is not claimed that this is as good as all broiler mashes on the market, it does show the extremes which are possible in deciding between animal and plant protein feeds in a formula. (Abstract—Poultry Science 29: 750, 1950.)

HETEROSIS FROM CROSSBREEDING AND FROM OUTBREEDING

G. E. DICKERSON, Q. B. KINDER, W. F. KRUEGER and H. L. KEMPSTER
University of Missouri, Columbia, Mo.

Twenty-one families of inbred lines of Leghorns, 6 of New Hampshires, 10 of R. I. Reds and 6 of White Rocks were crossed in 227 of 462 possible crossbred combinations of Leghorns with other breeds and in 133 of 285 possible intra-breed combinations, using first-year breeders. Also, intra-flock matings of selected older breeders were made in the four breeds.

Totals of 1657 crossbred, 1831 intra-breed cross and 1984 intra-flock chicks were hatched. Compared with the mean of the parental intra-bred crosses, crossbreds hatched as well, had 5 to 8 percent less mortality to 22 weeks, weighed 4 to 7 percent more at 8 and 12 weeks but little more at 22 weeks, and received higher live scores for fleshing, particularly among pullets at 22 weeks. In production from 154 to 300 days, crossbred advantage was 8-9 eggs for Leghorn-Hampshires (84) and Leghorn-Reds (80), but negligible for Leghorn-Rocks (72). Compared with reciprocals, crossbreds by Leghorn males were poorer in hatch and mortality to housing, but superior in growth, conformation, and adult mortality, sexual maturity and egg production. Compared with intra-flock matings, direction of outcrossing effect on viability and growth varied with breed, but outcrossing consistently improved adult viability and egg production. (Abstract—Poultry Science 29: 756, 1950.)

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REVIEW OF POULTRY PUBLICATIONS

Compiled by J. W. Kinghorne,
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GENETICS

ASMUNDSON, V. S. *(U. California, Davis.)* TURKEYS. *California Agric. 4:* 12. 1950.—Simple genetic principles are illustrated with plumage color in turkeys. The interrelated effects of environment and heredity are illustrated with pendulous crop.—*G. W. Bohn.* (Biological Abstracts)

BLOW, W. L., C. H. BOSTIAN, and E. W. GLAZENER. *(North Carolina State Coll., Raleigh.)* THE INHERITANCE OF EGG SHELL COLOR. *Poultry Sci. 29:* 381-385. 1950.—Estimates of heritability of egg shell color in breeds of chickens laying brown shelled eggs were made, using technics of the analysis of variance and intra-sire regression of the offspring on dam. Estimates of heritability of 0.3035, 0.9135, and 0.7763 were arrived at, using the sire variance, dam variance, and intra-sire regressions respectively. The weighted avg. of the estimates based on the sire variance and intra-sire variance, respectively, was 0.7616. No evidence of sex linkage of the genes affecting egg shell color was available; however, dominance was found to be involved.—*Authors.* (Biological Abstracts)

FUNK, C. W. KEYSTONERS DEVELOP BETTER CROSSBRED CHICKS. Silver Hamp chicks—crossbred bird developed at the poultry breeding farm of the Pennsylvania Farm Bureau Cooperative Association near Harrisburg after 3 year's work. *News for Farmer Cooperatives 17:* 7 March 1951.—(Experiment Station Record)

HUTT, F. B., and J. LONG. *(Cornell U., Ithaca, N. Y.)* SUNSUIT, A MUTATION REDUCING PLUMAGE IN THE FOWL. *Jour. Heredity 41:* 145-150. Illus. 1950.—When homozygous for the recessive autosomal gene sn the fowl is characterized by defective plumage. The remiges and rectrices are reduced in no. and length. These and other features may show defective webs, or be confined wholly or partially within persistent sheaths, so that in extreme cases the birds seem covered with quills. There is an excess production of the keratinized epithelium of the beak and toenails. Upon hatching, the sunsuit chick is easily recognized by its wiry or sticky down. Affected individuals are fully viable but subnormal in reproduction. The gene sn is not linked with duplex (D) nor with dominant white (I) and crest (Cr).—*R. K. Cole.* (Biological Abstracts)

KNOX, CHARLES W., and CLEMENT D. GORDON. *(U. S. Bur. Animal Indust., Washington, D. C.)* SELECTING BREEDING STOCK FOR BROILER PRODUCTION. *U. S. Dept. Agric. Leaflet. 233.* 1-7. Illus. 1943.—Selection of breeding stock for broiler production by early identification of the fast feathering, rapid growing chicks with superior breast development is discussed. Means of making adequate identification of fast feathering chicks at different ages is given as well as the

method of observing breast development. Selection of breeding stock with superior broiler characteristics can be done with no loss in egg production.—*C. W. Knox.* (Biological Abstracts)

LERNER, I. M. *(University of California)* IMPROVED EGG SIZE; HIGH HERITABILITY OF EGG WEIGHT GIVES RAPID RESPONSE TO SELECTIVE BREEDING. *California Agr. 4:* 6, December 1950.—The heritability of the hen-housed average egg production is in the neighborhood of 5%, and that of livability under 10%. The heritability of egg weight in contrast to these figures has been recently established as being about 60%.

The improvement of characters with low heritability has to be based primarily on methods of selection involving family averages—sister or progeny testing—while that of characters with high heritability is best pursued by the use of mass selection.

While the other characters cited—egg production, livability, hatchability—fall in the first category, egg size belongs to the second.

It is the property of high heritability which permits the breeder to apply successfully the principle of disassortative mating—the mating together of unlike birds. The breeder may constantly use this type of mating system to obtain birds possessing the desirably intermediate genetic constitution for egg size instead of changing the direction of selection over a period of years.

Under this plan, females laying large eggs would be placed in pens headed by sires from small-egg families, and females laying small eggs would be mated to males from large-egg families. (Experiment Station Record)

PARKER, J. E., and P. E. BERNIER. *(Oregon Expt. Sta. Corvallis.)* RELATION OF MALE TO FEMALE RATIO IN NEW HAMPSHIRE BREEDER FLOCKS TO FERTILITY OF EGGS. *Poultry Sci. 29:* 377-380. 1950.—Results from expts. over a 2-yr. period with 28 flock matings of New Hampshire chickens in which 10,924 eggs were incubated show that 6-7 males are required for each 100 hens in breeder flocks for consistent high fertility. In some instances fertility of eggs was over 90% when as few as 3-5 males were used. The relative number of males used also influenced the onset of fertility—the time required for maximum fertility to be attained after introducing the males in the flocks ranged from 9 days with 9 males per 100 hens to 16 days with 3.7 males. In 2 flocks in which a single male was mated to approx. 100 females, the eggs laid were 73 and 83% fertile.—*Authors.* (Biological Abstracts)

STURKIE, PAUL D. *(Rutgers U., New Brunswick, N. J.)* FURTHER STUDIES OF AUTOSOMAL NAKEDNESS IN THE DOMESTIC FOWL. *Amer. Nat. 84:* 179-182. 1950.—Male chickens heterozygous for a new type of autosomal nakedness were selected each yr. and mated to normal White Leghorn females. This study concerns the effects of natural selection for 8 generations upon the degree of nakedness and mortality. The degree of nakedness decreased progressively after the 3d generation of selection. Mortality in the 3d generation dropped to one half of that in the 1st and 2d generations and then declined thereafter and reached a low in the 7th generation. The results show that genetic modifiers against nakedness and the high mortality associated with it have accumulated as a result of natural selection.—*P. D. Sturkie.* (Biological Abstracts)

PHYSIOLOGY

BEZEM, J. J., F. BRUNNEKREEFT, M. J. E. ERNSTING, J. LEVER, and W. TH. NAUTA. *(U. Utrecht.)* THE DISTRIBUTION OF ORALLY ADMINISTERED RADIO-ACTIVE METHYL-THIOURACIL IN COCKERELS. *Acta Endocrinol. 3:* 151-155. 1949.—Radio-active-

S-labeled methylthiouracil was synthesized from $Na_2S^*O_4$ and admd. orally with a carrier of inactive methylthiouracil to 15-wk-old. cockerels. Excreta and organs were ashed (250 mg. aliquots + 2 ml. HNO_3 at 275°C. for 3 hrs.), the excess HNO_3 removed by evaporation and the SO_4 precipitated as $BaSO_4$ and counted under a mica window counter. Within 24 hrs. after a single dose, most of the S* is excreted (60-70%); the rest is chiefly found in the thyroid, the bases of the feather shafts, and probably the pituitary, though quantities here are at the limit of counting accuracy. The thyroid accumulated approx. 10 times as much S* as the feathers. After repeated dosage there is a definite tendency to cumulation.—*P. K. Bondy.* (Biological Abstracts)

BIELLIER, H. V., and C. W. TURNER. *(U. Missouri, Columbia).* SEXUAL DIMORPHISM IN THE SYRINX OF THE PEKIN DUCK. *Poultry Sci. 29:* 527-529. 1950.—A study was made to determine the role of sex hormones in controlling the sex dimorphism of the syrinx of the Pekin duck. Ducklings were placed on diets containing 40 mg. of crystalline testosterone per kg. of the ration and 88 mg. of dianisylhexene per kg. of the ration. At the end of the exptl. period of 4 weeks, all ducklings were sacrificed and wts. of the syrinx, testes, ovary and penis obtained. No apparent effect was noted upon exptl. animals treated with testosterone or dianisylhexene at levels indicated above.—*Authors.* (Biological Abstracts)

BRENEMAN, W. R. *(Indiana U., Bloomington.)* A STUDY OF THE PITUITARY-GONAD-COMB RELATIONSHIP IN NORMAL, UNILATERAL-CASTRATED, AND CAPONIZED CHICKS. *Jour. Exptl. Zool. 114:* 115-135. 1950.—1458 normal, 531 unilateral castrated, and 677 caponized chicks were studied from hatching to 140 days of age to analyze pituitary-gonad relationships. Chicks were operated at 5 days post-hatching. The left testis of the chick had a greater mean wt. than the right throughout the range of observations, and 2/3 of the left testes were larger than the right. The right testis of the unilateral castrate, however, was capable of greater growth than the right testis in unoperated normal chicks. At 60 days of age the testis was approx. equal in wt. to the 2 testes of the normal animals. After 60 days the testis was heavier than either of the normal gonads but did not equal the combined wts. Androgen secretion, as measured by comb growth, was less in the unilateral castrates than in the normal birds. Pituitary wts., however, were not significantly different from control pituitary wts. until about 95-100 days posthatching, at which time the pituitaries of the unilaterally castrated chicks exceeded those of the normals. Capon pituitaries were significantly heavier than either the control or unilateral pituitiaries after 20 days of age (15 days postoperative). The pituitary wts. of the unilateral castrates, therefore, were intermediate between those of capons and normals after about 100 days.—*Auth. (courtesy Wistar Bibl. Serv.)* (Biological Abstracts)

BURLINGTON, H., and V. F. LINDEMAN. *(Syracuse, U., N. Y.)* EFFECT OF DDT ON TESTES AND SECONDARY SEX CHARACTERS OF WHITE LEGHORN COCKERELS. *Proc. Soc. Exptl. Biol. and Med. 74:* 48-51. Illus. 1950.—Chicks given daily subcut, injns. of DDT (M.P. 109°C.) starting 8 days post-hatch showed marked inhibition of testes and secondary sex characters when examined 60 to 89 days later. There was also a slight decrease in the red blood cell count, but no difference in Hb levels or body wt. between exptl. and control animals. The structural similarity between DDT and certain synthetic estrogens is pointed out. —*H. Burlington.* (Biological Abstracts)

CAMPOS, AMADO C. and F. M. FRONDA. *(University of the Philippines, College of Agriculture, College, Laguna).* HORMONIZED ROOSTERS FOR CHRISTMAS. *Agricultural and Industrial Life, 12:* 30, 36.—To determine the effects of a chemical caponizer (ASL Stil-Capo) on roosters, 20 S. C. White Leghorn roosters were divided into two lots, one lot being the control and the other, the experimental. Into each of the experimental roosters one "Stil-Capo" pellet was implanted

under the skin just below the head. Both lots received similar feeds and practically the same treatment. It was observed that the experimental birds registered a steady increase in weight to 172 grams per bird in six weeks. On the other hand the control birds lost in weight. As was expected, the experimental birds consumed a little more feed than the controls. The effect of pellet implantation was exhibited by shrivelling of the comb as early as the third day after the pellet implantation. The experimental birds ceased to exhibit the instinct of fighting beginning the second week of the test, they failed to show their desire to mate after four days of the test, but reappeared when the combs of the treated birds began to turn red again. Upon postmortem examination, it was observed that the testes of the treated roosters have become degenerated, and the meat decidedly more tender than that of the controls.—*F. M. Fronda.*

COOPER, D., B. MARCH, and J. BIELY. *(U. British Columbia, Vancouver, Canada.)* THE EFFECT OF FEEDING THYROPROTEIN AND THIOURACIL ON THE VITAMIN A REQUIREMENT OF THE CHICK. *Endocrinology 46:* 404-406. 1950.—Hyper- and hypothyroidism were induced in chicks by feeding thyroprotein and thiouracil in the ration. Suboptimal doses equivalent to 25, 50, 75 and 100 I.U. a day of vitamin A were admd. orally over a period of 38 days. The hyperthyroid chicks showed smaller gains than the normals, but the gains in both groups were directly related to the dose of vitamin A. The hypothyroid chicks were the heaviest on the lower vitamin A dosages, but they showed no increase in wt. with increased vitamin A dosage. It was concluded that the metabolic requirement for vitamin A is markedly influenced by the thyroid activity.—*J. M. Moss.* (Biological Abstracts)

DURAISWAMI, P. K. *(U. Liverpool, Eng.)* INSULIN-INDUCED SKELETAL ABNORMALITIES IN DEVELOPING CHICKENS. *Brit. Med. Jour. 1950:* 384-390. 1950.—A variety of different skeletal deformities was produced in chicks by injn. of insulin into the eggs up to the 6th day of incubation; injn. of other solns. was without effect. Specific staining of cartilage sections showed a deficiency of chondroitinsulphuric acid in the insulin-treated embryos, and the deformities are ascribed to this deficiency.—*J. N. Mills.* (Biological Abstracts)

EBERT, J. D. AN ANALYSIS OF THE EFFECTS OF ANTI-ORGAN SERA ON THE DEVELOPMENT, IN VITRO, OF THE EARLY CHICK BLASTODERM. *Jour. Expt. Zool. 115:* 351. November 1950.—The results clearly show that antigenic substances identical, or closely related, to those of organs of the adult chicken are present in the early chick blastoderm prior to the appearance of the corresponding organs or organ primordia. Moreover, these results indicate that the antigens described may be localized in fairly definite areas of the blastoderm as early as the definitive primitive streak stage. (Experiment Station Record)

GODFREY, EDWARD F., and R. GEORGE JAAP. *(Ohio State U., Columbus.)* ESTROGENIC INTERRUPTION OF BROODINESS IN THE DOMESTIC FOWL. *Poultry Sci. 29:* 356-361. 1950.—To date, broody birds have been interrupted by being confined in small cages for periods of 3-6 days. Such treatment is apparently successful because of the strangeness of location and the prevention of natural nesting. Using a single subcut. injn. of 15 mg. diethylstilbestrol dissolved in 1 ml. sesame oil, broodiness was interrupted in 28 of 37 hens. The failures occurred in June and July, presumably due to warmer weather. Increasing the dosage to a single injection of 30 mg. diethylstilbestrol in 2 ml. of sesame oil, resulted in the interruption of 113 of 115 birds which became broody during Aug., Sept. and early Oct. When compared to "coop" interrupted birds, the estrogenically interrupted birds showed no difference in subsequent egg production, mortality, or in the time required to return to production. Since prolactin is known to cause broodiness, it is thought that the high estrogenic dosage may have caused a general suppression of the hypophysis and thus decreased the amount of prolactin.—*E. F. Godfrey.* (Biological Abstracts)

GORDEUK, STEPHEN JR., and MARION L. GRUNDY. *(Pennsylvania State Coll., State College.)* OBSERVATIONS ON CIRCULATION IN THE AVIAN KIDNEY. *Amer. Jour. Vet. Res. 11:* 256-259. 1950.—Vinylite resin corrosion specimens of the renal venous and arterial systems were prepd. from 31 cockerels. The renally directed blood flow in the cocygeo-mesenteric vein, the marked difference in size between the afferent and efferent veins, and the apparent inadequacy of the arterial system give evidence for a portal circulation in the avian kidney. —*Authors.* (Biological Abstracts)

HAMBURGER, V., and H. L. HAMILTON. A SERIES OF NORMAL STAGES IN THE DEVELOPMENT OF THE CHICK EMBRYO. *Jour. Morphology 88:* 49, January 1951. (Experiment Station Record)

HARPER, J. A., and J. E. PARKER. *(Oregon Expt. Sta., Corvallis.)* FAMILY DIFFERENCES IN FERTILITY OF TURKEY HENS. *Poultry Sci. 29:* 471-473. 1950.—Differences in family fertility of turkey hens were found to exist when hens were artificially inseminated at 2-week intervals. The differences in fertility were greater when measured by a 6-week duration period than when hens were inseminated at 2-week intervals.—*Authors.* (Biological Abstracts)

JUHN, MARY. *(U. Maryland, College Park.)* THE ACTION OF THIOURACIL UPON THE SPURS OF THE DOMESTIC FOWL. *Jour. Endocrinol. 5:* 290-292. 1948.—The modifications arising in the spurs of cockerels, cocks, and capons kept upon a diet containing 0.5% of thiouracil are described. When admn. of the drug is commenced in the adult fowl there develops a characteristic hyperemic zone in the spur at its junction with the shank bone. This is followed by a loosening of the spur from its normal firm attachment so that it becomes movable. The spur also undergoes changes in shape. X-ray photographs demonstrate the reduction of the bony central core of the spur and decalcification at the point of union with the shank. Spurs of cockerels fed thiouracil from 1 day of age exhibit continued growth, but the normal attachment of the spur to the shank never takes place. A hyperemic zone is not developed here, indicating that union is inhibited in these cases while in the adult there is an active resorption of tissue at the spur-shank junction.—*Mary Juhn.* (Biological Abstracts)

JUHN, M. NON-EFFECT OF A GROWTH HORMONE PREPARATION IN THE REGENERATING FEATHER. *Proc. Soc. Expt. Biol. and Med. 76:* 118, January 1951.—An attempt was made to cause acceleration of feather growth in fowl by injections of growth hormone in the vicinity of regenerates. All tests were negative in feather growth but induced pattern changes indicated the presence of traces of thyrotrophin in the preparation. (Experiment Station Record)

KOSIN, I. L. *(State Coll. Washington, Pullman.)* SOME ASPECTS OF EARLY EMBRYONIC MORTALITY IN DOMESTIC FOWL. *Northwest Sci. 24:* 31. 1950.—*An abstract.* (Biological Abstracts)

NEHER, B. H., and R. M. FRAPS. *(U. S. Dept. Agric., Beltsville, Md.)* THE ADDITION OF EGGS TO THE HEN'S CLUTCH BY REPEATED INJECTIONS OF OVULATION-INDUCING HORMONES. *Endocrinology 46:* 482-488. 1950.—Ovulations were induced in hens of low to moderate production at about the time of lay of the terminal egg of a 2-egg clutch, and at succeeding intervals of approx. 24, 26 or 28 hrs. until the ovary failed to respond. Air-dried anterior pituitary tissue of mature male chickens and progesterone were used to force ovulation. Excluding 3 birds recently placed in cages, the following additions were made to the expected 2-egg clutch of each of 50 hens: in 6 hens, 5 eggs; in 7 hens, 4 eggs; in 11 hens, 3 eggs; in 10 hens, 2 eggs; in 13 hens, 1 egg; in 3 hens, none. In at least the longer sequences, the decrease in wt. of yolks was more rapid than in normal clutches of equal length, suggesting that rate of follicular growth limited the num-

ber of ovulations possible in these hens. Of 60 hens serving as controls, only 4 laid clutches of more than the anticipated 2 eggs; these 4 laid 3-egg clutches. Delays of 1 to 4 days beyond the expected time of lay were observed in 4 hens receiving relatively high dosages of progesterone.—*Auth. summ.* (Biological Abstracts)

OLSEN, M. W., and S. J. MARSDEN. *(U. S. Dept. Agric., Beltsville, Md.)* VARIABILITY AMONG TURKEY EMBRYOS AT TWENTY-FOUR HOURS OF INCUBATION WITH RESPECT TO HATCHABILITY. *Poultry Sci. 29:* 414-419. 1950.—A study was conducted in which 3451 fertile turkey eggs were incubated for 24 hrs., then candled and the blastodiscs classified as to appearance and size. Those embryos judged to be the most advanced at 24 hrs. of incubation gave an avg. hatch of 87.6% of fertile eggs; the intermediate ones 64.1%; and embryos showing least development, 28.4%. In each of 6 separate hatches, those embryos most advanced at 24 hrs. always hatched best, and those of intermediate development gave the 2d highest hatch. The differential in hatchability between the embryos of the 3 groups was found to be due largely to mortality during the 1st week of incubation. It is suggested that the group 3, or slow-developing, discs are largely responsible for the so-called normal peak of mortality which occurs on the 4th and 5th days of incubation. No clear-cut evidence could be found for the inheritance of slow-developing or defective embryos.—*Auth. summ.* (Biological Abstracts)

ROMIJN, C. STOFWISSELINGSONDERZOEK BIJ DE KIP. [METABOLISM OF THE HEN.] *Tijdschr. Diergeneesk. 75:* 465-480. 1950.—The respiratory metabolism of the hen as determined in a "closed system" is described. Heat production was calculated from the analysis of the air in the respiration chamber, the vol. of the chamber, the volume of the animals, and other data.—*K. Büchli.* (Biological Abstracts)

REYNIERS, J. A., P. C. TREXLER, R. F. ERVIN, M. WAGNER, T. D. LUCKEY, and H. A. GORDON. *(U. Notre Dame, Ind.)* SOME OBSERVATIONS ON GERM-FREE BANTAM CHICKENS. *Lobund Repts. 2:* 119-148. Illus. 1949.—Of 12 germ-free White Wyandotte Bantam chickens started, 2 surpassed the age of 325 days. A germ-free chick hatched from an egg laid by a germ-free hen completed the first life cycle in such animals. Growth curves, hematological data and organ wts. indicate that the germ-free birds were similar to comparable controls (however, the number of their blood lymphocytes and the proportionate wt. of the small intestine seemed to be lower). There appeared to be a normal amount of fat, vitamins, ash and moisture in the liver. The vit. content of the ceca was higher than expected in view of the lack of intestinal flora. No anti-bacterial antibodies were found in the germ-free birds up to the age of 8 wks. In animals older than 225 days, antibodies could be demonstrated in low titer against 2 of the 5 bacterial antigens isolated in pure culture from the diet prior to sterilization.—*H. A. Gordon.* (Biological Abstracts)

SHARMA, G. P. *(Poultry Res. Centre, Edinburgh.)* A STUDY OF THE INCIDENCE, DISTRIBUTION AND CHARACTERISTICS OF BLOOD SPOTS AND MINIATURE EGGS. *Proc. Roy. Soc. Edinburgh 63B(pt. 3, paper 21):* 302-324. Illus. 1949.—The material studied consisted of records of 292,548 eggs in the Brown Leghorn flock at the Poultry Research Centre, Edinburgh, recorded from 1940 to 1946. The proportion of blood spotted to total production was 0.31% for the whole flock and 0.16% for the pullets; 16% of the latter produced one or more blood-spot eggs. The comparable figures for miniatures were 0.15% for the whole flock and 0.11% for pullets; 11.6% of pullets were affected. In pullets the proportion of blood spots rose as the season progressed, and then fell off again towards the end of the laying cycle. No similar seasonal trend could be identified in the incidence of miniatures. Among the various inbred lines, differences were exposed in the proportion of both blood spots and miniatures occurring in them, and in the % of birds affected. The lines which showed a high incidence of the 2 abnormalities

were not the same except in one case. The % of miniatures showed a general tendency to rise as the birds became older, and the differences among age-groups did not seem to be restricted to particular lines. While differences in the incidence of both abnormalities occur among the various inbred lines of the flock, and thus suggest that both have some hereditary basis, their behaviour diverges in other respects. Yolk has been shown to be present in the contents of every miniature egg examined, and consequently it is considered to have been the effective stimulus leading to the secretion of various egg envelopes in miniature eggs. —*G. P. Sharma.* (Biological Abstracts)

SCHLAMB, K. F., and R. L. BRYANT. *(North Dakota Agric. Expt. Sta., Fargo.)* EFFECT OF STILBESTROL ON TURKEY HENS. *Bimo. Bull. N. Dakota Agric. Expt. Sta. 13:* 18-20. 1950.—Injection of stilbestrol enabled turkey hens to produce eggs and fatten at the same time. Treated birds consumed more food per lb. of bird than untreated. The effect of stilbestrol on production, hatchability, and fertility of eggs was negligible.—*J. F. Reed.* (Biological Abstracts)

SINGH, HARBHAJAN, and C. S. SHAFFNER. *(U. Maryland, College Park.)* EFFECT OF THYROPROTEIN AND CALORIC LEVEL OF DIET ON METABOLIC RATE OF CHICKENS. *Poultry Sci. 29:* 575-578. 1950.—The rate of oxygen consumption of 2-week-old chicks fed various levels of thyroprotein from hatching time was detd. The rate of oxygen consumption was also detd. at 2-week intervals from hatching to 8 weeks of age for chicks fed thyroprotein at the levels of 5, 10, and 15 g./cwt., and likewise for chicks fed high and low caloric diets with and without thyroprotein (7 g./cwt.). The metabolic response to graded doses of thyroprotein appeared to be proportional to dosage at levels greater than 5 g./cwt. Increasing the caloric value of the ration appeared to raise the metabolic rate somewhat and increase the metabolic response to thyroprotein.—*Auth. summ.* (Biological Abstracts)

SMITH, A. U. *(Nation. Inst. Med. Res., London, N. W. 3.)* THE CONTROL OF BACTERIAL GROWTH IN FOWL SEMEN. *Jour. Agric. Sci. 39:* 194-200. Illus. 1949.—A study was made of the bacterial flora in fresh and in stored, undiluted fowl semen and also in diluted samples. Coliform bacilli, staphylococci, diphtheroid bacilli and hemolytic streptococci were found. The same flora inhabits the cloaca, but the sperm mass from the vas deferens was sterile. When stored for 48 hrs. at 2°C., or for 24 hrs. at room temp., the bacterial population in the semen increases greatly. Egg white improved the sperm motility. Sulfathiazole was toxic, while streptomycin in several dilutions checked bacterial growth but did not improve motility or fertilization power of stored diluted semen.—*Henry Dorsey.* (Biological Abstracts)

NUTRITION

ACKERSON, C. W., R. L. BORCHERS, JOHN E. TEMPER, and F. E. MUSSEHL. *(Nebraska Agric. Expt. Sta., Lincoln.)* THE UTILIZATION OF FOOD ELEMENTS BY GROWING CHICKS. XII. THE EFFECT OF ADDITIONS OF IODOCASEIN AND VITAMIN CONCENTRATE TO THE RATION. *Poultry Sci. 29:* 640-643. Illus. 1950.—In a controlled feeding expt. with 3 lots of 16 chicks, additions of iodocasein or the vitamin concentrate produced no effect on the body wt. or the N, Ca or P retention of the chicks at 4 weeks of age.—*Authors.* (Biological Abstracts)

AMBROSE, DUDLEY C. *(U. California, Berkeley.)* SOYBEAN MEALS AS POULTRY FEED. *California Agric. 4:* 15, 16. 1950.—Feeding tests with chicks indicated little or no differences among 8 commercial soybean meals that were tested. All were high-quality products. Most or all of the growth inhibitor (s) present in raw soybeans was removed in processing.—*G. W. Bohn.* (Biological Abstracts)

BERG, L. R., C. E. BEARSE, J. McGINNIS, and V. L. MILLER. THE EFFECT OF REMOVING SUPPLEMENTAL AUREOMYCIN FROM THE RATION ON THE SUBSEQUENT GROWTH OF CHICKS. *Archives of Biochem. 29:* 404, December 1950.—Deleting aureomycin from the ration resulted in a cessation of the accelerated growth response observed during the first 4½ weeks of life when the test material was fed. Adding the aureomycin product to the ration at 4½ weeks of age caused an immediate acceleration of growth, the gain being even slightly greater than for birds which had received the material from 1 day of age.

Results indicate that the mode of action of the antibiotics in promoting accelerated growth is dependent upon the material being present in the diet continuously. Although the mode of action of antibiotics in promoting increased growth has not been shown to be related to the presence of or concentration of the antibiotic in the blood stream, it is of interest, in view of the present results, to note that Dowling et al. have shown that aureomycin disappears from the blood stream within 24 hours after administration. (Experiment Station Record)

BIELY, MARCH J., and R. J. YOUNG. SUPPLEMENTATION OF MEAT SCRAP WITH AMINO ACIDS. *Poultry Sci. 24:* 444-449. 1950.—Tests showed a rather wide variation in growth rates of chicks fed meat scraps and horsemeat meal in comparison with fish meal. Investigation indicated some samples of the meat scraps deficient in one or more of the essential amino acids. Feeding tests were conducted to determine the possible cause of this variation. Amino acid analysis of samples on both total and digestible protein showed no correlation between the amt. present of any of the amino acids assayed and growth rates of chicks. The meat scraps was low in tryptophan and both meat and horsemeat meal were lower than fish meal in methionine and cystine. Addition of methionine, tryptophan or choline to meat and horsemeat meal had no effect on growth rates of chicks. Addition of lysine to meat scraps produced results almost comparable to that of fish meal. The lysine found in meat scraps that is normally considered available, evidently is unavailable to the chicks. Adding methionine in addition to the lysine to meat scraps resulted in faster chick growth, indicating that methionine was the 2d limiting amino acid in meat scraps. (Biological Abstracts)

BIRD, FRANCIS H. *(Eastern States Farmers' Exchange, Inc., Rockville, Conn.)* THE TRYPTOPHAN REQUIREMENT OF TURKEY POULTS. *Poultry Sci. 29:* 737-740. 1950.—The tryptophan requirement of White Holland turkey poults was determined by feeding a purified diet in which protein was supplied by peanut meal and gelatin fortified with DL-methionine and L-cystine. These poults required 0.28% of L-tryptophan in the diet for optimum growth to 3 weeks of age. A comparison of the efficiency of DL-tryptophan with that of the L-isomer to support growth indicated that the White Holland turkey poult can utilize 38.2% of the D-isomer. The same amount of tryptophan was required for optimum efficiency of feed utilization as was required for optimum growth.—*F. H. Bird.* (Biological Abstracts)

BIRD, H. R. *(Bur. Animal Indust., Beltsville, Md.)* NEW TRENDS IN POULTRY FEEDING. *Feed Bag 26:* 15, 59, 60. 1950.—The author gave the requirements of young chickens as 7-10 μg. of vit. B_{12} per lb. of feed, with the requirement for breeding birds somewhat less. Chicks hatched from the eggs of hens fed a deficient diet feather poorly, grow slowly, and show a high mortality. Slow growth can be very largely overcome by supplying enough of the vitamin in the chick's diet, but the high mortality and poor feathering can be corrected better by supplying the vitamin in the hen's diet. The requirement of chicks for antibiotics was listed as 7-10 mg. per lb. of feed. Aureomycin, streptomycin, terramycin, and penicillin were all listed as being effective, and also an organic arsenic compound, which produces growth effects of about the same magnitude as aureomycin, but the 2 effects are also complementary. Because of the belief that fish meal and fish solubles contain no antibiotics,

Bird feels that the products derived from fermentation are B_{12}-antibiotic supplements and should not be termed A.P.F.—*H. L. Wilcke.* (Biological Abstracts)

BLAKELY, R. M. *(Dom. Exptl. Sta., Swift Current, Saskatoon, Canada.)* RAPE-SEED OILCAKE MEAL. *Canadian Grain Jour. 5:* 12. 1950.—Feeding-value tests on rape-seed oilcake meal in turkey rations indicated that high levels of over 7% of the total diet did not produce the same rate of growth as comparable rations containing other protein supplements. Also, it was found to contain an antithyroid factor causing gross enlargement of the thyroid gland. This, however, could be counteracted by minute quantities of synthetic thyroxine but the growth depression factor still existed. This growth depression factor was found to be due not to a deficiency in the quality of the protein but rather to a toxic factor. Rape-seed oilcake meal is not recommended for inclusion in the starting ration of turkeys but is acceptable up to 7% after 8 to 12 weeks.—*J. F. Wintermantel.* (Biological Abstracts)

BLAYLOCK, L. G., and L. R. RICHARDSON. *(Texas Agric. Expt. Sta., College Station.)* PEANUT MEAL, MIXTURES OF SOYBEAN AND COTTONSEED AND MIXTURES OF SOYBEAN AND PEANUT MEALS AS SOURCES OF PROTEIN FOR BABY CHICKS. *Poultry Sci. 29:* 656-660. 1950.—Baby chicks which received the basal diets grew at a fairly rapid rate, but addition of 0.1% of L lysine increased the rate of growth in every case.Peanut meal was a satisfactory source of protein when supplemented with an APF concentrate and with 0.3% of DL methionine and 0.2% of L lysine. The chicks were slightly heavier when the amts. of methionine and of lysine were doubled. In studies with mixtures of soybean and peanut meals, methionine was the 1st limiting factor. When the mixture was supplemented with both methionine and an APF concentrate the chicks were slightly heavier than those which received the methionine alone.—*L. R. Richardson.* (Biological Abstracts)

BOHSTEDT, G. ANTIBIOTICS AND VITAMIN B_{12} IN LIVESTOCK FEEDING. *Feedstuffs, 23:* 48, January 13, 1951.—In October, 1950, it was ruled by the Association of American Feed Control Officials that the term "APF" should no longer be used as a label for the material in question, starting January 1, 1951.

What was originally known as APF when it was thought to contain vitamin B_{12} and before antibiotics were recognized for animal feeding, is now called "vitamin B_{12} supplement."

"Vitamin B_{12} supplement" must contain at least 1.5 milligrams of vitamin B_{12} per pound. "Antibiotic feeding supplement" must contain at least one gram of the particular antibiotic or mixtures of antibiotics per pound.

Antibiotics do not seem to carry directly over to the young. They have their greatest usefulness for growth and also in many cases for the avoidance of certain digestive disturbances. Some of them, such as streptomycin, seem not to be readily absorbed from the intestines, but have their function confined to the digestive tract.

The level of antibiotics in feeds is said to be only from about 1/20 to 1/50 of the amounts that are used in the treatment of disease.

It has been found in the case of growing chickens that after liberal amounts of antibiotics have been fed, a sudden withdrawal of the antibiotics from the ration resulted in a check of the rate of growth and in a declining thrift of the bird. Seemingly its digestive system had come to depend upon a more or less constant intake of the antibiotic. This controlled the unfavorable organisms, but on being omitted, left the animal with a weakened defense against the resurgence of the particular bacteria.

About a half pound in 100 lb. of feed has given good results in experimental work.

Actually antibiotics because of stimulating growth, may step up the requirements by animals for certain other nutrients such as protein, vitamins and trace minerals. (Experiment Station Record)

BRIGGS, G. M. *(U. Minnesota, St. Paul.)* ANTIBIOTICS IN POULTRY RATIONS. *Feedstuffs [Minneapolis] 22:* 32-36. 1950.—If either pure antibiotics or certain crude antibiotic sources are added in sufficient quantity to rations for normal chicks or turkey poults, growth rates may be increased 10 to 15%, but not 50% as has been reported. Penicillin, streptomycin, aureomycin, and terramycin are mentioned specifically. Chloromycetin is inactive. The early work with animal protein factors is discussed briefly. The antibiotics must be fed to produce growth stimulation. They are inactive when injected. Under normal conditions all-vegetable protein rations may be used as starting rations, particularly since antibiotics are available. Several phenylarsonic acid derivatives also stimulate growth to a lesser extent, also some of the coccidiostatic agents, such as nitrophenide and sulfaquinoxaline, and also sulfasuxidine, and exceedingly high levels of vitamin C. The term "promotant" is suggested and defined as "any substance, or agent, which promotes a desirable effect, such as faster growth or better feed efficiency or improved reproduction, by its action on the intestinal flora when added to the diet of a non-ruminating animal." It "may be a drug, a vitamin (when the action is indirect in this manner), or any other type of compound. It includes, among others, the antibiotics, the phenylarsonic acid derivatives, and several of the sulfa drugs." Twenty to 25 g. of pure antibiotic per ton of feed, or about 5 pounds of most fortified APF supplements are required to give a growth stimulation.—*H. L. Wilcke.* (Biological Abstracts)

BRISSON, GERMAIN J. *(Sci. Serv. Dept. Agric., Ottawa, Canada),* N. NIKOLAICZUK, and W. A. MAW. *(McGill U., Montreal, Canada).* FEEDING VALUE OF HORSEBEAN (VICIA FABA L.) FOR CHICKS. *Sci. Agric. [Ottawa] 30:* 384-391. 1950.—Feeding expts. with Barred Plymouth Rock chicks demonstrate that horse-bean meal as the principal protein source in practical starter rations is deficient in nutritional factors essential for opt. body growth and proper feathering. The proteins of fish meal and sunflower seed meal possess a superior complementary effect; casein supplemented the basal horsebean meal ration more adequately than soybean meal and linseed oil meal and meat meal proved better than linseed oil meal. A modified horsebean meal basal ration containing soybean oil meal was significantly improved by the addition of fish meal, but meat meal was without effect. On the basis of wt., condensed fish solubles and fish meal were of about equal value in overcoming the inadequacy of the basal ration. The primary inadequacy of horsebean meal protein lies in the low content of sulfur-containing amino acids. Supplementary DL-methionine alone was highly beneficial, but the greatest improvement in growth and feathering was obtained on the addition of DL-methionine plus choline to the basal horsebean ration. Glycine, DL-tryptophan, lysine and folic acid were without effect. —*N. Nikolaiczuk.* (Biological Abstracts)

BRUGGEMANN, H. *(U. Breslau, Germany.)* DIE VITAMINFRAGE IN DER GEFLUGELZUCHT. [THE VITAMIN PROBLEM IN THE REARING OF POULTRY.] *Umschau 44:* 179-183. Illus. 1940. —A survey. (Biological Abstracts)

BURKE, K. A., R. F. NYSTROM, and B. CONNOR JOHNSON. *(U. Illinois, Urbana.)* ROLE OF METHIONINE AS METHYL DONOR FOR CHOLINE SYNTHESIS IN THE CHICK. *Fed. Proc. 9:* 157. 1950. —*An abstract.* (Biological Abstracts)

CARLSON, C. W. THE EFFECT OF ANTIBIOTICS ON TURKEY EGG HATCHABILITY AND POULT GROWTH. *South Dakota Farm & Home Research, 2:* 31, Winter 1951.—It appears probable therefore, that supplementation of vitamin B_{12} and aureomycin to the diet of the turkey hen is of no practical value, since there was no effect on hatchability, and since sufficient amounts of vitamin B_{12} and aureomycin can be added to the poult starter diet to overcome any effect of a deficient hen diet. The tremendous response in poult growth which can be obtained from aureomycin supplementation is remarkable to say the least. (Experiment Station Record)

CHENG, AMBER L. S., and HARRY J. DEUEL, JR. STUDIES ON CAROTENOID METABOLISM.—X. THE SITE OF CONVERSION OF CAROTENE TO VITAMIN A IN THE CHICK. *Jour. Nutr. 41:* 619, August 10, 1950.—When B-carotene was fed to vitamin A-depleted chicks, vitamin A first appeared in the intestinal wall after one hour and in the liver after three hours.

The proportion of vitamin A per gram of tissue was constantly higher in the intestinal wall than in the liver for a 6-hour period after the feeding of carotene.

These data are interpreted as proof that the chick is able to change B-carotene to vitamin A in the intestinal wall. (Experiment Station Record)

COUCH, J. R. COTTONSEED MEAL AS A SOURCE OF PROTEIN FOR GROWING CHICKS (ABSTRACT). *Proc. Res. Conf. on Processing as Related to Cottonseed Meal Nutrition at Southern Reg. Res. Lab., New Orleans, Louisiana.* November 13-14, 1950. p. 31. (Experiment Station Record)

DIETZ, A. T. PROTEIN INTAKE OF LAYING HENS. TWO LEVELS OF PROTEIN IN DIET FOR LAYING HENS COMPARED IN TESTS IN SOUTHERN CALIFORNIA. *California Agr. 4:* 10, October 1950.—With two cooperating poultrymen a test was set up to make a comparison between rations containing about 16% and 19% protein. All conditions, including housing, age of birds and sources of stock, were as near the same for birds on each ration and on each ranch as was possible.

The average egg production during the test period was 131.8 eggs per hen on the medium protein ration compared with 124.5 per hen for the high protein ration.

Culling and mortality were not widely different but the total of those that died and were culled was higher on the high protein ration on both ranches.

Feed cost was 18c per hundredweight higher for the high protein ration. (Experiment Station Record)

COUCH, J. R., and R. L. ATKINSON. *(Texas Agric. Expt. Sta., College Station.)* VITAMIN B_{12}, APF CONCENTRATES AND ANTIBIOTICS IN TURKEY RATIONS. *Feedstuffs [Minneapolis] 22:* 57. 1950.—The growing turkey does not require the addition of vit. B_{12} to an all-vegetable (corn-soybean oilmeal) protein ration unless antibiotics are fed. However, during the first 8 weeks, addition of aureomycin and vit. B_{12} to a basal ration increased the wt. of poults 20-25% and decreased the feed required per pound of gain by 20%. Growth responses were also obtained with streptomycin and penicillin with B_{12} in the corn-soybean oilmeal basal ration.—*H. L. Wilcke.* (Biological Abstracts)

COUCH, J. R., and J. R. REED. *(Texas A. and M. Coll., College Station.)* VITAMIN B_{12}, APF CONCENTRATES AND ANTIBIOTICS IN POULTRY RATIONS. *Feedstuffs [Minneapolis] 22:* 16. 1950.—Chicks kept fed a basal ration of corn, milo, soybean oil meal with vitamin and mineral supplements weighed 1.5 lbs. at 10 weeks. When an APF concentrate without an antibiotic was added, the chicks weighed 2.25 lbs. at 10 weeks, and when an APF concentrate containing aureomycin was used, the chicks weighed 2.75 lbs. All of these chicks were kept on wire floors. When similar groups of chicks were kept on litter, the weights at 10 weeks were 2.25, 2.25, and 3-3.25 lbs. respectively. Chicks raised in June, July, and August weighed slightly less. The feathering of the chicks grown on litter was excellent. Turkey poults fed an antibiotic such as aureomycin weighed about 0.75 lb. more at 8 weeks than those which received no antibiotic.—*H. L. Wilcke.* (Biological Abstracts)

DAUGHERTY, J. W. CARBOHYDRATE METABOLISM IN CHICKENS INFECTED WITH EIMERIA TENELLA. *Jour. Parasitology, 36 (No. 6, Sec. 2):* 42, December 1950.—Chickens infected with the cecal coccidia, *Eimeria tenella,* have shown to exhibit certain physio-

logical manifestations, e.g., high blood sugar level, low muscle glycogen, impaired coordination, and muscle asthenia, among others. (Experiment Station Record)

DEMERS, J. M., and R. BERNARD. FURTHER WORK ON THE NUTRITION OF DUCKLINGS. A. LIPOTROPIC FACTORS. B. SULPHUR AMINO ACID REQUIREMENTS. *Canadian Jour. Res. Sect. E. Med. Sci. 28:* 202-211. 1950.—Using a purified diet deficient in choline and containing 18% casein, it was found that in the duckling: (a) betaine and aminoethanol have little or no lipotropic activity, are poor growth factors, and cannot prevent perosis; (b) monomethylaminoethanol and dimethylaminoethanol, on the other hand, have well marked lipotropic activity. Both substances stimulate growth and are antiperotic, dimethylaminoethanol being the most active of the two in these respects; (c) ducklings, like chicks, appear unable to methylate aminoethanol to any extent; (d) a level of 28% casein is more satisfactory than one of 18% in the prevention of fatty infiltration of the liver in ducklings. Betaine and methionine have a definite lipotropic activity, when fed to ducklings along with a semipurified diet containing peanut meal as the only natural ingredient. The substitution of yellow corn meal to sucrose in the above semipurified diet inhibits the lipotropic activity of methionine, without affecting that of betaine. The availability of a protein low in sulfur amino acids has resulted in the prepn. of a more hypolipotropic diet. On this diet, ducklings presented livers containing, on the avg., 24% lipids. Methionine added to this diet is strongly lipotropic, but is without effect on growth. Methionine will promote growth only in presence of choline. Ducklings like chicks and poults appear to be able to convert methionine to cystine. In presence of 0.4% cystine, approx. 0.5% methionine is required for normal growth.—*Auth. abst.* (Biological Abstracts)

ENGELMANN, C. WAHLT DAS HUHN SEINE NAHRUNG NACH DEM GESCHMACK? [DOES THE FOWL CHOOSE ITS FOOD ACCORDING TO THE TASTE-] *Umschau 44:* 828. 1940.—Hens prefer wheat-like kernels of rye or other cereals. This preference is mainly on the basis of form rather than taste.—*F. Schwanitz.* (Biological Abstracts)

FORREST, W. J., JACOB BIELY, and B. MARCH. *(U. Vancouver, Canada.)* APF IN THE LAYING RATION. *Feedstuffs [Minneapolis] 22:* 30-33. 1950.—Pullets which had been reared on litter were kept in laying cages and fed a basal diet with no animal protein, with additions of 0.3 mg. vit. B_{12} per 100 lbs. ration, 0.6 mg. vit. B_{12}/100 lbs. ration, and another with fish meal. Egg production in all 4 lots was high and the differences between lots were not statistically significant. There was some evidence that the lots which received the higher levels of APF and fish meal required slightly less feed to produce a dozen eggs, but the differences were very slight. It appeared that APF supplements used in this expt. had little, if any, influence on egg production or feed efficiency. It appears that when hens are fed a practical, all-vegetable ration, there is sufficient vit. B_{12} supplied by the ration and by intestinal synthesis to meet the requirements for egg production. This is not necessarily true on purified diets. Olcesa et al. (Jour. Nutr. 41: 73-87. 1950) recently showed that the addition of vit. B_{12} to a sucrose-soybean protein diet improved egg production of hens fed the purified diets. It was further shown that when a starch-soybean protein diet was used, egg production and hatchability were improved over those observed with comparable groups fed sucrose. It is suggested that starch promoted the intestinal synthesis of vit. B_{12}.—*H. L. Wilcke.* (Biological Abstracts)

GASTROCK, E. A. THE PIGMENT GLAND-FRACTIONATION PROCESS. *Proc. Res. Conf. on Processing as Related to Cottonseed Meal Nutrition at Southern Reg. Res. Lab., New Orleans, Louisiana.* November 13-14, 1950. p. 14. (Experiment Station Record)

GILLIS, M. B. OBSERVATIONS ON BETAINE, CHOLINE AND METHIONINE IN CHICK NUTRITION. *Feedstuffs 23:* 30, January 20, 1951.—It is concluded:

(a) That supplements of synthetic methionine may be expected to improve the rate of growth when added to chick rations containing less than the minimum recommended allowance of this amino acid. The success of methionine supplementation, however, demands that excess quantities be avoided and that all other essential amino acids be provided in proper amounts. The response to methionine appears to be greatest when the supplemented ration does not contain high levels of vitamin B_{12}.

(b) That choline supplements are indicated where practical experience has shown resulting benefits. Careful attention to the content of vitamin B_{12} and folic acid in the diet, as well as amino acid precursors of choline, may significantly reduce the choline requirement. The particular susceptibility of turkeys to perosis has given more importance to choline or betaine supplements in rations for this species at least until the many factors involved in perosis are better understood.

(c) Betaine can spare choline and methionine by assuming a portion of the functions of each and by promoting the synthesis of these compounds within the animal body. In practical chick rations betaine has been found to promote growth and prevent perosis in much the same way as choline. (Experiment Station Record)

GRAU, C. R., and M. KAMEI. *(U. California, Berkeley.)* AMINO ACID IMBALANCE AND THE GROWTH REQUIREMENTS FOR LYSINE AND METHIONINE. *Jour. Nutrition 41:* 89-101. 1950.—White Leghorn chicks reared on a commercial-type mash until 2 wks. old were segregated into groups of 7-10 chicks each and fed purified diets complete in all nutrients known to be required by the chick and varying only in the protein levels and either lysine, or methionine and cystine. It was found that as the protein level of the diet is raised, the lysine and methionine plus cystine requirements also increase, but at a slower rate. Thus, a protein which is slightly deficient in these amino acids at the 20% protein level may be fed satisfactorily by increasing the protein level to 30%. Attempts to simulate high protein levels by adding free amino acids to diets barely adequate in methionine plus cystine resulted in growth depressions which were not alleviated by increasing the methionine content of the diets. It is postulated that the excesses of free amino acids may have caused an increased requirement for some other nutrient. The addition of a mixture of arginine, methionine and phenylalanine to a diet barely adequate in lysine had no effect on the growth rate. Small increments of these amino acids were not responsible for the protein effect. The growth depressive effect of methionine levels above the optimum is overcome by higher protein levels. When the diet contains 20% protein, the chick's requirements for methionine and cystine appear to be met by levels of approx. 0.5% and 0.3% of the diet, respectively, or 0.8% methionine alone.—*Auth.* (courtesy Wistar Bibl. Serv.).

GURCAY, REMZI, R. V. BOUCHER, and E. W. CALLENBACH. UTILIZATION OF VITAMIN A BY TURKEY POULTS.—I. CRYSTALLINE CAROTENE, CRYSTALLINE VITAMIN A ACETATE AND "BLACK COD" LIVER OIL. *Jour. Nutr. 41:* 565. August 10, 1950.—On the basis of International Units of vitamin A activity, "Black Cod" liver oil, lot B-16487, was found to be approximately twice, and crystalline vitamin A acetate approximately 4 times, as efficient in supporting normal growth in poults as the corresponding levels of crystalline carotene.

At intakes higher than those required to support normal growth much more vitamin A was stored in the liver when either crystalline vitamin A acetate or "Black Cod" liver oil was fed than when the diet contained corresponding levels of crystalline carotene.

Poults which received crystalline vitamin A acetate had about twice as much vitamin A in the blood plasma as those which received corresponding levels of crystalline carotene. (Experiment Station Record)

HALBROOK, E. R., FAY CORDS, A. R. WINTER and T. S. SUTTON. VITAMIN B_{12} PRODUCTION BY MICROORGANISMS ISOLATED FROM POULTRY HOUSE LITTER AND DROPPINGS. *Jour. Nutr. 41:* 555, August 10, 1950.—Only 2.8% of 142 isolations of microorganisms from poultry house litter and droppings which were studied for vitamin B_{12} production produced no detectable quantity (less than 0.01 mμg per milliliter of broth) of vitamin B_{12} activity as determined by microbiological assay with *Lactobacillus leichmannii* (A.T.C.C. 4797); 32.3% produced between 0.01 and 0.10; 22.5% between 0.1 and 0.4; and 42.2% more than 0.4 mμg per mlliliter of broth.

Among the better vitamin B_{12}-producing organisms isolated from poultry house litter and droppings were yeast, molds, and many classes of bacteria. One organism was isolated which produced more vitamin B_{12} as measured microbiologically than either *Bacillus megatherium, Streptomyces aureofaciens* or *Streptomyces griseus* under our test conditions. This organism has been tentatively identified as a strain of *Aerobacter aerogenes.* (Experiment Station Record)

HALBROOK, E. R., A. R. WINTER, and T. S. SUTTON. *(Ohio State U., Columbus.)* THE EFFECT OF MANAGEMENT ON THE VITAMIN B_{12} CONTENT OF POULTRY HOUSE LITTER. I. AS MEASURED BY CHICK GROWTH. *Poultry Sci. 29:* 672-678. 1950.—S. C. White Leghorn chicks were reared to 8 weeks on a vitamin B_{12}-deficient diet on ground corn cob litter changed weekly, left unchanged for 8 weeks, and used for over 1 year. The chicks reared on the built-up litter used for over 1 yr. averaged 42% heavier at 8 weeks than chicks on litter changed weekly during the brooding period, and 23% heavier than chicks on the new unchanged litter. Chicks on built-up litter fed the basal diet grew as rapidly as did chicks on unchanged litter fed the basal plus a vitamin B_{12} supplement at the rate of 20 μg./kg. of diet. The results show that litter management is important in conducting vitamin B_{12} chick assays and that vitamin B_{12} deficiencies are less likely to occur on old litter than on new.—*Authors.* (Biological Abstracts)

HALBROOK, E. R., T. S. SUTTON, and A. R. WINTER. *(Ohio State U., Columbus.)* THE EFFECT OF MANAGEMENT ON THE VITAMIN B_{12} CONTENT OF POULTRY HOUSE LITTER. II. AS DETERMINED BY MICROBIOLOGICAL ASSAY. *Poultry Sci. 29:* 679-684. 1950.—A microbiological assay for vitamin B_{12} was made of ground corn cob litter used by poultry for different periods, and of the droppings from the exptl. chicks using this litter. A basal all-vegetable vitamin B_{12}-deficient diet was used with and without a commercial vitamin B_{12} supplement. The influence of storage at various temps. on the vitamin B_{12} content of droppings was also studied. The vitamin B_{12} content of litter increased with age from a value of only 1 millimicrogram per gram of new cobs to 124 for litter used by chicks for 8 weeks, and 261 for built-up litter used for over 1 year by hens. All birds were fed vitamin B_{12}-deficient diets. Fresh droppings assayed an average of 92 millimicrograms of vitamin B_{12} per gram wet wt., or 465 on a dry wt. basis. Droppings from chicks on built-up litter fed a vitamin B_{12} deficient diet were 71% more potent than droppings from chicks on new unchanged litter, and equalled those of chicks fed a vitamin B_{12} supplement. Storage of droppings for 1 week at 30 and 37°C. resulted in an increase of 900 and 390%, respectively, in the vitamin B_{12} content. No increase occurred on storage of 4°C.—*Authors.* (Biological Abstracts)

HALICK, J. V., and J. R. COUCH. ANTIBIOTICS IN MATURE FOWL NUTRITION. *Proc. Soc. Expt. Biol. and Med. 76:* 58, January 1951.—Data have been obtained on the effect of feeding aureomycin, penicillin, streptomycin and APF concentrate and Liver "L" in a diet low in vitamin B_{12}. Hatchability of eggs from birds fed this diet unsupplemented decreases to zero after the fourth week. Injection of vitamin B_{12} into the hens improved hatchability somewhat. The feeding of aureomycin and penicillin alone apparently assisted in the depletion of birds of vitamin B_{12} and possibly of the unidentified factor. Liver "L" contains a factor necessary for normal hatchability and embryonic development. (Experiment Station Record)

HILL, D. C., and H. D. BRANION. *(Ontario Agric. Coll., Guelph, Canada.)* THE USE OF ANIMAL PROTEIN FACTOR SUPPLEMENT IN A PRACTICAL POULTRY RATION. *Poultry Sci. 29:* 405-408. 1950.—6% fishmeal in a practical type chick starter was progressively replaced with an APF supplement. The wts. of the birds at 8 weeks suggested a growth factor in the fishmeal which was not supplied in adequate amts. by the APF supplement at a level of 0.11% of the diet. Addition of 0.2% methionine to a diet containing APF supplement but no fishmeal was ineffective. Further addition of 5% dried whey improved growth. However, all supplemented diets were superior to a negative control diet containing soybean oil meal as the only protein supplement. The 3 groups of female birds which had received the negative control diet, the diet containing 6% fishmeal and the diet containing no fishmeal but APF supplement were continued on expt. They were fed diets somewhat lower in protein but of similar composition and were maintained on wire floors. At 20 weeks of age the birds fed the diet containing 6% fishmeal were superior in wt. to those on the negative control diet or the diet containing APF supplement but no fishmeal.—*D. C. Hill.* (Biological Abstracts)

HILL, D. C., and H. D. BRANION. *(Ontario Agric. Coll., Guelph, Canada).* A COMPARISON OF COMMERCIAL ANIMAL PROTEIN FACTOR SUPPLEMENTS IN CHICK STARTER DIETS. *Poultry Sci. 29:* 743-744. 1950.—A significant but variable growth response was obtained when each of 3 animal protein factor (APF) supplements were added to basal ration containing soybean oil meal as the only protein supplement. Feeding the basal ration for 2 weeks previous to the addition of the APF supplements did not increase the growth response.—*D. C. Hill.* (Biological Abstracts)

HILL, D. C., J. D. McCONACHIE, K. M. GARTLEY, and H. D. BRANION. *(Ontario Agric. Coll., Guelph, Canada.)* THE USE OF A COMMERCIAL ANIMAL PROTEIN FACTOR SUPPLEMENT IN A HATCHING RATION. *Poultry Sci. 29:* 744-745. 1950.—An animal protein factor (APF) supplement incorporated at a level of 0.11% into an all-vegetable ration containing soybean oil meal maintained a hatchability level equivalent to that given by 6% fish meal. Hens were raised and maintained on wire floors. Chicks from the hens receiving the APF supplement grew more rapidly than those from hens receiving 6% fish meal when they were maintained on wire and fed an all-vegetable protein starter.—*D. C. Hill.* (Biological Abstracts)

HOGAN, A. G. *(U. Missouri, Columbia.)* THE VITAMIN REQUIREMENTS OF POULTRY. *Nutrition Abst. and Rev. 19:* 751-791. 1950.—A critical discussion of published work, mainly subsequent to 1937, on the requirements of poultry for all of the 11 well-recognized vitamins, and for some dietary factors not well identified, with a summary of deficiency symptoms. The requirements considered relate separately to growth, egg production, and hatchability; subsidiary phases of vitamin metabolism, such as storage in liver and in egg, function and dietary precursors. The results discussed are summarized in 17 tables and for each vitamin the author expresses his preference among the requirements proposed by different authors. The literature citations number 464.—*H. H. Mitchell.* (Biological Abstracts)

JOHNSON, ELTON L. *(Iowa State Coll., Ames.)* METHIONINE, CHOLINE, FISH SOLUBLES AND MILK IN RATIONS FOR GROWING TURKEYS IN CONFINEMENT. *Poultry Sci. 29:* 661-665. 1950.—Expts. were conducted with Beltsville Small White and Broad Breasted Bronze turkeys kept in a continuous-type house with separate pens including wire-floored sunporches for each exptl. group. Corn cobs and wood shavings were used for litter. The basal ration contained corn, oats, bran, middlings, alfalfa meal, meat and bone scrap, soybean meal, bone meal, oyster shell, salt, manganese sulfate, A and D oil, riboflavin, niacin and pantothenic acid. Addition of (1) 7% dried buttermilk, (2) 0.1% choline chloride, (3) 0.1% choline chloride and 0.3% DL-

methionine, or (4) 0.1% choline chloride, 0.3% DL-methionine and 3% fish solubles, to the basal ration did not increase growth or affect mortality. Perosis and other leg disorders were not numerous or specific for any treatment. Results indicate that the basal ration contained sufficient methionine and choline for normal growth from 10 to 20 weeks of age. The known and unknown factors in fish solubles were not limiting factors. Whether fish solubles or animal protein supplements would have improved the basal diet under conditions preventing access to feces remains unanswered.—*Elton Johnson.* (Biological Abstracts)

JUKES, THOMAS H. *(American Cyanamid Co., Pearl River, N. Y.)* SOME EFFECTS OF AUREOMYCIN AND OTHER ANTIBACTERIAL SUBSTANCES ON THE GROWTH OF CHICKENS, PIGS, TURKEYS. *Feedstuffs [Minneapolis] 22:* 46-48. 1950.—*Review.* (Biological Abstracts)

KING, RICHARD A. *(U. Connecticut, Storrs.)* WHY HAULING SHRINKS VARY. *U. S. Egg and Poultry Mag. 56:* 14-15, 29-30. Illus. 1950.—In this study broilers, 14 weeks old, were divided into 3 groups: crated but not trucked or fed; birds trucked 300 miles, fed corn when first loaded; birds trucked 300 miles without feed. These groups were further divided in that they were fed a high energy ration and others a straight broiler ration. The results show that a bird fed a high energy ration lost less weight in all cases than did those fed on a regular ration. The test further shows that birds lose most of their weight during the first few hours of being away from feed. This test was not carried out on enough birds to be conclusive. However, the results are of interest to poultry processing.—*G. W. Newell.* (Biological Abstracts)

KRATZER, E. H. *(U. California, Davis.)* THE ACTIVITIES OF D AND L LYSINE FOR TURKEY POULTS. *Jour. Nutrition 41:* 153-157. 1950.—A ration in which the protein was supplied by sesame seed oil meal was supplemented by the isomers of lysine. D-Lysine was unable to replace L-lysine for growth or normal feather pigmentation in poults. Levels of D-lysine of up to 1% did not depress growth, while 2% caused decreased growth when added to an adequate ration.—*Auth.* (courtesy Wistar Bibl. Serv.).

LYMAN, C. M. REVIEW OF NUTRITIONAL RESEARCH ON COTTONSEED MEAL. *Proc. Res. Conf. on Processing as Related to Cottonseed Meal Nutrition at Southern Reg. Res. Lab., New Orleans, Louisiana.* November 13-14, 1950. p. 7.—A number of years ago Clark postulated that the change in solubility of gossypol which takes place as a result of a moist heat treatment reflected a combination of gossypol with some of the protein to form an insoluble compound. He called the gossypol, so changed, "combined gossypol." We frequently refer to this form of gossypol as "inactivated gossypol" since its effect, if any, on animals which are susceptible to gossypol is very small.

In 1944, the group at Texas A & M reported a method for controlling the processing variables in the hydraulic procedure in order to make meal very low in free gossypol. The results of feeding meal processed under a variety of different conditions brought out the relationship between moisture, temperature, and time of processing to the free gossypol content of cottonseed meal.

During recent years it has been seriously questioned whether gossypol is the toxic principle of cottonseed. Experimental findings have certainly justified this questioning; for example, in an investigation by Boatner and co-workers, pure gossypol was fed to chicks. As a result there was little retardation in the growth rate; whereas feeding cottonseed pigment glands, or uncooked hexane-extracted cottonseed, resulted in marked depression in growth rates.

On the other side of the picture, Lillie and Bird found that pure gossypol and pigment glands containing an equivalent amount of gossypol had the same effect on chicks when the gossypol was fed in capsule form.

The recent paper by Castillon and Altschul on the "Preparation of Water-Soluble Combination Products of Gossypol and Their Toxicity to Aquarium Fish" is of particular significance in connection with this problem. Gossypol-protein, gossypol-starch, gossypol-dextrose, gossypol-glycine, and gossypol-lysine were prepared. The toxicity of the complex materials varied over a wide range. (Experiment Station Record)

LILLIE, ROBERT J., and H. R. BIRD. *(U. S. Dept. Agric., Beltsville, Md.)* EFFECT OF ORAL ADMINISTRATION OF PURE GOSSYPOL AND OF PIGMENT GLANDS OF COTTONSEED ON MORTALITY AND GROWTH OF CHICKS. *Poultry Sci. 29:* 390-393. 1950. —Studies with R. I. Red chicks were conducted to determine the effect of admn. of pure gossypol and cottonseed pigment glands upon mortality and growth. Pure gossypol and pigment glands admd. daily by capsule at levels which supplied equivalent quantities of gossypol were of approx. equal toxicity judged by their effects on mortality and growth. Gossypol admd. by capsule as 0.063% of the diet possessed growth-inhibiting properties. It is concluded that the toxicity of pigment glands admd. in this manner is entirely due to their gossypol content.—*R. J. Lillie.* (Biological Abstracts)

MATTERSON, L. D., and E. P. SINGSEN, LOIS DECKER and ANNA KOZEFF. *(U. Connecticut, Storrs.)* COMMERCIAL A.P.F. CONCENTRATES IN POULTRY RATIONS. *Poultry Sci. 29:* 466-467. 1950.—Expts. were conducted with sex-linked R.I.R. x B.R. chicks with 4 different commercial sources of A.P.F. to determine (1) if undepleted chicks hatched from eggs produced by hens fed a diet containing meat and fish would respond to commercially produced A.P.F. concentrates when the ration contained 5% fish meal and 2.5% meat scraps and (2) if there is any difference in the growth promoting abilities of commercially produced A.P.F. concentrates. Results showed differences between the negative control and supplemented diets with probabilities of < 0.10 to < 0.001. It is concluded that A.P.F. concentrates vary in their growth-promoting abilities and that certain products effectively supplement rations containing meat and fish.—*Authors.* (Biological Abstracts)

MARLOW, H. W. COW FECES AND CHICK DEVELOPMENT. *Science 113:* 326, March 23, 1951.—Both male and female chicks fed on a 20% level of extracted feces showed a significant decrease in body and comb weights, both with respect to the controls and with respect to those groups that had feces extract or bile applied to the comb.

Since the groups that were fed 20% dried unextracted feces actually gained some weight over the controls, it seems apparent that the changes in those receiving extracted feces are due to removal of the alcohol-soluble fraction containing mainly the growth factor which causes increased comb growth. (Experiment Station Record)

MENGE, H., R. E. MORENG, and G. F. COMBS. EFFECT OF YOLK REMOVAL IN DAY-OLD CHICKS ON EARLY NUTRITIONAL REQUIREMENTS. *(Introduced by H. R. Bird.) Proc. Soc. Expt. Biol. and Med. 76:* 46, January 1951.—An operative technic for the removal of the yolk from day-old chicks has been described. This procedure was developed to render chicks relatively free of the nutrients transmitted through the yolk from the dam. Observations on the growth rate of deutectomized chicks as compared with that of unoperated controls show that the operation had little or no effect on growth when an adequately supplemented diet was supplied. The results of these trials demonstrate that vitamin B_{12} or a substance possessing vitamin B_{12} activity was present in the yolk of the day-old chick and that it was removed by deutectomy. (Experiment Station Record)

NORRIS, L. C. STUDIES ON UNIDENTIFIED FACTORS REQUIRED FOR CHICK GROWTH. *Feedstuffs, 23:* January 27, 1951, p. 39.—One of the surprising observations made in this experiment was the fact that by supplementing the diet with streptomycin in the sulfa-thalidine a growth response equal to that obtained with dried brewers'

yeast was obtained. A combination of dried brewers' yeast and these antibiotics caused no further improvement in growth. A possible explanation is that the antibiotics changed the character of the microflora in the intestinal tract so that the synthesis of the unknown chick growth factor was obtained in amounts adequate to meet the needs of the chicks for rapid growth.

From the results which have been obtained in other laboratories, and in view of the results which I have presented in this paper, it seems clear that not all of the growth factors required by the chick have yet been identified. It also seems clear that one or more of these factors is probably of some importance in practical chick feeding. (Experiment Station Record)

OLCESE, ORLANDO, J. R. COUCH, and CARL M. LYMAN. *(Texas A. and M. Coll., College Station.)* VITAMIN B_{12} CONCENTRATES IN THE NUTRITION OF THE MATURE DOMESTIC FOWL. *Jour. Nutrition 41:* 73-87. 1950.—Two expts. were conducted with single comb White Leghorn pullets maintained in individual cages with raised screen bottoms. A purified diet was used which contained 22% soybean protein, 68% carbohydrate (sucrose of starch), 3% soybean oil, 2% fish oil (3000 A-400 D), and 5% salts IV. This diet was supplemented with a source of vits. E and K and with known B vits., except vit. B_{12}, in amts. which were thought to meet the requirements of the birds. Varying amts. of 3 different vit. B_{12} concentrates were fed with the above diet. The hatchability of eggs from hens fed the low vit. B_{12} diet decreased to 0 in 2-4 wks. Egg production was also decreased when this diet was fed. The addition of APF concentrates improved the egg production and hatchability of hens fed the purified diet but failed to produce normal hatchability as compared to a group fed a practical all-mash diet. There was a tendency for the hatchability to decrease about the 9th or 10th wk, even when adequate vit. B_{12} was fed. This indicates that a depletion of some unknown factor or factors may have taken place after the initial depletion of vit. B_{12}.—*Auth.* (courtesy Wistar Bibl. Serv.).

OLCESE, ORLANDO, J. R. COUCH, J. H. QUISENBERRY, and P. B. PEARSON. *(A. and M. Coll. of Texas, College Station.)* CONGENITAL ANOMALIES IN THE CHICK DUE TO VITAMIN B_{12} DEFICIENCY. *Jour. Nutrition 41:* 423-431. 1950.—Two experiments were run with 3 groups of 4 Single White Leghorn hens in each test. The birds were kept in individual laying cages and were artificially inseminated weekly with mixed semen from New Hampshire cockerels. Eggs were set weekly and were candled on the 17th and 18th days of incubation. All eggs which were removed at candling and those which failed to hatch were broken to determine the time of death of the embryo and to record gross macroscopic abnormalities. The diet used in this study contained soybean protein, sucrose and salts IV. All known vitamins were added in amounts which were thought to meet the bird's requirements, with the exception of vit. B_{12}. Different quantities of vit. B_{12} concentrate from 2 sources (Lederle and Merck) were added to the above basal diet. A peak of embryonic mortality was found at about 16 to 18 days of incubation in eggs laid by hens fed the basal diet low in vit. B_{12}. The most characteristic deformity observed in these embryos was "spindly legs." This condition was designated as "myoatrophy of the legs" and is characterized by atrophy of the leg muscles. The legs appeared to be normal in length but were hemorrhagic in appearance. A malposition, "head between the thighs," occurred with unusual frequency in embryos from hens fed a vit. B_{12} deficient diet.—*Auth.* (courtesy Wistar Bibl. Serv.).

OLESON, J. J., B. L. HUTCHINGS, and A. R. WHITEHILL. THE EFFECT OF FEEDING AUREOMYCIN ON THE VITAMIN B_{12} REQUIREMENT OF THE CHICK. *Archives of Biochem. 29:* 334, December 1950.—The interdependence of the growth effects of vitamin B_{12} and aureomycin in the chick have been studied. Each factor appears to have a sparing action on the other. The limiting amount of vitamin B_{12}

has been determined, while the minimal amount of aureomycin is less than the 5 mg./kg. used here. (Experiment Station Record)

PARKER, F. M. NUTRITION FOR 1951. *Flour & Feed 51:* 28, January 1951.—Several, but not all, antibiotics stimulate growth in animals. The levels required to produce this added growth vary with different antibiotics; and among those so far tested penicillin, as the procaine salt, shows superior activity on a gram per gram basis.

Where it had been difficult or impossible to demonstrate a need for supplemental vitamin B_{12} in turkey rations, the addition of antibiotic appears to emphasize the response of the poult to vitamin B_{12}.

Although vitamin B_{12} is definitely needed for proper hatchability and livability in chicks, and for proper reproduction in swine, there is little evidence yet that there is any effect of antibiotics on "carry-over value" in chicks, poults, or weanling pigs, or on egg production or hatchability. (Experiment Station Record)

RAMOS, FRANCISCO T. *(University of the Philippines, College of Agriculture, College, Laguna).* A COMPARATIVE STUDY OF TWO RATIONS FOR GROWING CHICKS. *Philippine Agriculturist, 33:* 250-256. 1950.—This paper reports the results of a study to determine the influence of the addition of grain to an all-mash ration for growing chicks. Two lots of chicks, repeated three times, were used. Both lots received the College all-mash chick ration during the first four weeks, but from the fifth to the twelfth weeks, the experimental lot was given coarsely ground corn as grain in the proportion of 1 part grain to every 2 parts, by weight, of the mash mixture. The results show that although at the age of twelve weeks the chicks that were fed with the College all-mash chick ration were slightly heavier than the chicks fed the grain-and-mash ration, the difference in weight was statistically insignificant. The lot fed with College all-mash chick ration required only a little more feed to produce a kilogram gain and suffered a slightly higher mortality than those given the grain-and-mash ration, but it produced a higher percentage of superior-class birds.—*F. M. Fronda.*

RASMUSSEN, R. A., K. L. SMILEY, J. G. ANDERSON, J. M. Van LANEN *(Hiram Walker, Inc., Peoria, Ill.),* WILLIAM L. WILLIAMS, and ESMOND E. SNELL. *(U. Wisconsin, Madison.)* MICROBIAL SYNTHESIS AND MULTIPLE NATURE OF LACTOBACILLUS BULGARICUS FACTOR. POSSIBLE ROLE IN CHICK NUTRITION. *Proc. Soc. Exptl. Biol. and Med. 73:* 658-660. 1950.—A previously reported *(Williams, Hoff-Jorgensen and Snell, Jour. Biol. Chem. 177:* 933. 1949.) unidentified essential growth factor for *Lactobacillus bulgaricus,* termed LBF, was shown to be produced during the growth of microorganisms which do not require added supplies for growth. Culture filtrates of *Ashbya gossypii* were the best sources found. Chromatography on paper revealed that the factor occurs in 3-5 forms having different Rf values. The most mobile of these was concentrated about 100-fold and fed to chicks on a purified diet. Small but reproducible growth responses resulted which suggest that the concentrates contained a factor in addition to the known vitamins which was helpful in achieving max. growth in this animal.—*Authors.* (Biological Abstracts)

REISER, RAYMOND. *(Texas Agric. Expt. Sta., College Station.)* METABOLISM OF POLYUNSATURATED FATTY ACIDS IN CHICKENS. *Fed. Proc. 9:* 218. 1950.—*An abstract.*

REISER, RAYMOND. *(Texas Agric. Expt. Sta., College Station.)* FATTY ACID CHANGES IN EGG YOLK OF HENS ON A FAT-FREE AND A COTTONSEED OIL RATION. *Jour. Nutrition 40:* 429-440. 1950.—Two groups of hens were placed on a rigid fat-free and a 4% cottonseed oil ration, respectively. Alternate eggs were incubated and analyzed. No differences in egg production were noted but their fertility and hatchability and low mortality of embryos were favored by the fat-free ration. Analyses of the egg yolks showed no change in moisture, total fat, phospholipid or cholesterol content. Six-double-bond

acids disappeared from the glycerides of the eggs of hens on the fat-free ration after 4 wks., and 5-double-bond acids after 8 wks. Two-, 3-, and 4-double-bond acids decreased more slowly, reaching 16-25% of their control level in 14 wks. The phospholipid acids showed similar changes. On the same basal fat-free ration plus 4% cottonseed oil the 6-double-bond acid disappeared at the same time as on the fat-free ration, but the 3-, 4- and 5-double-bond acids reached a min. after 2 wks. The 2-double-bond acid remained unchanged. It is concluded that the hen cannot synthesize polyunsaturated fatty acids from non-fat precursors, but that it can synthesize 3-, 4- and 5-, but not 6-, double-bond acids from linoleic (2-double-bond) acid.—*Auth.* (courtesy Wistar Bibl. Serv.).

RICHARDSON, L. R., and L. G. BLAYLOCK. *(Texas Agric. Expt. Sta., College Station.)* SUPPLEMENTS TO SOYBEAN AND COTTONSEED MEAL DIETS FOR POULTS AND GROWING TURKEYS. *Poultry Sci. 29:* 651-655. 1950.—Fish meal, fish solubles and an APF concentrate were investigated as supplements to a milo soybean meal diet for poults. The poults which received fish meal or the APF concentrate were larger at 6 weeks than those that received the basal diet or fish solubles, but the differences were not statistically significant. Cottonseed meal was also tested as a source of protein for poults. One diet which contained cerelose and 60% of cottonseed meal supported a rapid rate of growth in poults when it was supplemented with 0.5% of L lysine, 0.2% of DL methionine and 0.1% of DL tryptophan. When a milo-cottonseed meal diet was supplemented with only 0.3% of L lysine, white feathers, severe perosis, and a slow rate of growth were obtained. The rate of growth increased immediately and pigment returned to new feathers when the lysine was increased to a level of 0.8%. Mixtures of soybean and cottonseed meals which were tested were unsatisfactory for poults. The mortality rate was high and there was a high incidence of white feathers and of perosis. The absence of pigmentation in the feathers suggested that the mixtures were deficient in lysine.—*L. R. Richardson.* (Biological Abstracts)

SANDERS, B. G., S. O. BROWN, and J. R. COUCH. *(Texas A. and M. Coll., College Station.)* A FEATHERING SYNDROME IN CHICKS AFTER FEEDING OPTIMAL LEVELS OF LYSINE IN ABSENCE OF ARGININE. *Proc. Soc. Exptl. Biol. and Med. 74:* 114-117. Illus. 1950. —The addition of lysine to a chick diet deficient in lysine, arginine, and methionine caused an abnormal feathering which was characterized by curved and degenerate feathers. A detailed description of the feathering abnormalities is given. When arginine was added, along with the lysine, the feathering of the birds was normal. The addition of the lysine without arginine apparently created a severe deficiency or imbalance of the latter amino acid which resulted in the abnormal feathering.—*J. R. Couch.* (Biological Abstracts)

SCOTT, M. L. STUDIES ON ENLARGED HOCK DISORDER OF TURKEYS. *Feed stuffs 23:* 18, February 3, 1951.—The studies presented in this report were conducted to obtain further information on the effect of dietary creatine upon the enlarged hock disorder and to determine if some other factor is concerned in the metabolism of creatine by young poults.

The results show that the combination of vitamin E and inositol in the presence of creatine was completely effective in preventing the enlarged hock disorder under the conditions of the experiment. (Experiment Station Record)

SEDLNITZKY, M. *Wien. Tieraerztl. Monatsschr., 37:* 644, 1950. VITAMIN T. *Vet. Med. 46:* 161, April 1951.—Feeding an agent called vitamin T or torutilin at the rate of 200 mg. per chick daily with grain rations reduced flock mortality 40%; increased growth and weight of chicks during the brooding period; effected early maturity in hens, which began laying two weeks earlier than controls; and increased egg production by 100% during the first six months.—*R. S.* (Experiment Station Record)

SINGSEN, E. P., L. D. MATTERSON, and ANNA KOZEFF. *(Storrs Agric. Expt. Sta., Conn.)* PHOSPHORUS IN POULTRY NUTRITION. IV. RADIOACTIVE PHOSPHORUS AS A TRACER IN STUDYING THE METABOLISM OF PHYTIN BY THE TURKEY POULT. *Poultry Sci. 29:* 635-639. 1950.—Phytin containing a high concn. of P^{32} was prepd. by biological synthesis. Radioactive KH_2PO_4 was fed to corn plants in culture soln. during the early milk stage of growth. At maturity the grain was harvested, ground, and phytin isolated as Ca phytate. A 100 mg. sample of isolated Ca phytate averaged 47,040 counts/min. Tagged Ca phytate was fed to 3 lots of 7-day-old turkey poults receiving (1) no. vit. D, (2) cod liver oil, (3) irradiated animal sterols. P. of the phytin molecule (fed as phytin tagged with P^{32}) moved quickly throughout the body of the turkey poult, apparently by exchange reactions. P^{32} from the phytin was deposited in the bone salts. The presence of dietary vit. D increased significantly the amount of P^{32} deposited. 80 A.O.A.C. chick units of vit. D from irradiated 7-dehydrocholesterol promoted a greater deposition of P from phytin (P^{32}) than did an equal unitage of vit. D from U.S.P. reference cod liver oil.—*E. P. Singsen.* (Biological Abstracts)

SINGSEN, E. P., and L. D. MATTERSON, ANNA KOZEFF, and LOIS DECKER. *(U. Connecticut, Storrs.)* THE EFFECT OF CHOLINE AND VITAMIN B_{12} CONCENTRATES ON GROWTH IN THE TURKEY POULT. *Poultry Sci. 29:* 468-469. 1950.—Adding choline to a low-choline basal ration promoted a significant growth response. When a vitamin B_{12} concentrate was added to the ration, either alone or in combination with choline, growth was not improved. Addition of a commercially produced A.P.F. concentrate, alone, did not improve growth, whereas a combination of A.P.F. and choline resulted in a growth response that was superior to that obtained with choline.—*E. P. Singsen.* (Biological Abstracts)

SOKOLOFF, BORIS, JAMES B. REDD, and RAYMOND DUTCHER. *(Florida So. Coll., Lakeland.)* NUTRITIVE VALUE OF MANGROVE LEAVES (RHIZOPHORA MANGLE L.) *Quart. Jour. Florida Acad. Sci. 12:* 191-194. 1949(1950).—The protein content of dried leaves of *R. mangle,* red mangrove, is 12.1-14.3%, crude fiber 13.9%, crude fat 2.9%. The Ca content is 16.1 mg./g., sulfur 0.62%, iodine 8 mg./kg., manganese 27 mg./kg., ash 6.65%, thiamin 1.56-2.03 μg./g., riboflavin 4.5-5.6 μg./g., folic acid 0.60-0.07 μg./g., niacin 20.3-28 μg./g., and pantothenic acid 4-4.5 μg./g. A chick-feeding trial indicates that mangrove leaf, if properly dehydrated and supplemented with vit. A, might be used in chick rations instead of alfalfa.—*Boris Sokoloff.* (Biological Abstracts)

STEPHENSON, E. L. THE USE OF DETOXIFIED COTTONSEED MEAL AS A PROTEIN SUPPLEMENT FOR LAYING HENS (ABSTRACT). *Proc. Res. Conf. on Processing as Related to Cottonseed Meal Nutrition at Southern Reg. Res. Lab., New Orleans, Louisiana.* November 13-14, 1950. p. 36. (Experiment Station Record)

STOKSTAD, E. L. R. *(Amer. Cyanamid Co., Pearl River, N. Y.)* EFFECT OF AUREOMYCIN ON ANIMAL NUTRITION. *Feedstuffs [Minneapolis] 22:* 17, 18, 46-48. 1950.—APF supplements obtained from aureomycin fermentation produced increases in rate of growth of chicks when added to diets containing fish meal and fish solubles. This demonstrated growth factors in addition to B_{12}. The requirement of the turkey poult for this second factor appears to be greater than that of chickens. It has also been demonstrated that aureomycin mash is effective in promoting growth in pigs, and pure crystalline aureomycin produced a growth response similar to that obtained with aureomycin fermentation products. Streptomycin, succinylsulfathiazole and 3-nitro-4-hydroxyphenylarsonic acid produced similar, but less marked, growth responses. In one expt., the rate of growth of pigs was increased 40% by adding aureomycin to vegetable type diets. The use of pure aureomycin in feeds is not economically feasible, since the amount needed appears to be

20-25 g. per ton of feed. Crude prepns. are available. The animal protein factor thus seems to consist of at least 2 components, which are vitamin B_{12} and an antibiotic growth factor. Fish meal and meat scraps do not provide the antibiotic factor. Aureomycin improves feathering, pigmentation and general appearance of chicks as well as rate of growth. Vit. B_{12} is carried over from the hen to the chick, but the antibiotic factor does not appear to be carried over. Aureomycin does not appear to be beneficial to ruminants, but it may be beneficial for calves where the rumen has not yet started to function. Streptomycin, terramycin, penicillin, certain sulfa drugs, and phenylarsonic acids also produce growth responses. There has been no evidence of the development of strains of bacteria resistant to aureomycin.—*H. L. Wilcke.* (Biological Abstracts)

STOKSTAD, E. L. R., and T. H. JUKES. *(Amer. Cyanamid Co., Pearl River, N. Y.)* GROWTH-PROMOTING EFFECT OF AUREOMYCIN ON TURKEY POULTS. *Poultry Sci. 29:* 611-612. 1950.—Addition of aureomycin to the diet led to considerable increase in the growth of turkey poults, both in the presence and absence of vit. B_{12} supplementation. Vit. B_{12} alone produced little or no growth increase. (Biological Abstracts)

STOKSTAD, E. L. R., and T. H. JUKES. EFFECT OF VARIOUS LEVELS OF VITAMIN B_{12} UPON GROWTH RESPONSE PRODUCED BY AUREOMYCIN IN CHICKS. *Proc. Soc. Expt. Biol. and Med. 76:* 73, January 1951.—A growth-promoting effect for aueromycin was noted both in the presence and absence of added vitamin B_{12}. The mortality of deficient chicks on the diet containing no added vitamin B_{12} was markedly reduced by aureomycin. The addition of sulfamethazine to the diet did not appear to effect the quanitative requirement of chicks for vitamin B_{12}. (Experiment Station Record)

SUNDE, M. L., W. W. CRAVENS, C. A. ELVEHJEM, and J. G. HALPIN. *(U. Wisconsin, Madison.)* THE EFFECT OF FOLIC ACID ON EMBRYONIC DEVELOPMENT OF THE DOMESTIC FOWL. *Poultry Sci. 29:* 696-702. Illus. 1950.—The effect of a folic acid deficiency in the hen's diet on embryonic development is presented. A more acute deficiency may be produced when sucrose serves as the carbohydrate instead of dextrin. Laying birds fed the diet containing dextrin for 30 weeks showed a decline in egg production and hatchability but not in body wt. A deficiency of folic acid in the hen's diet results in a high incidence of embryonic deaths on about the 20th day of development. Such embryos appear normal but die soon after pipping the air cell. Some embryos from severely depleted hens exhibited a marked bending of the tibiotarsus. Other less frequently observed symptoms were syndactyly, deformed mandibles and parrot beak. Injn. of 5 μg. or more of folic acid into the egg prior to incubation markedly increased hatchability. Hatchability was also markedly improved by injecting folic acid as late as the 17th day of incubation. Livability of the chicks when placed on a folic acid-deficient ration was low unless 15 μg. or more of the vitamin was injd. and unless the injn. was made prior to the 4th day of incubation.—*M. L. Sunde.* (Biological Abstracts)

WATERS, NELSON F. *(U. S. Region. Poultry Lab., East Lansing, Mich.)*, A. C. GROSCHKE *(Michigan Agric. Expt. Sta., East Lansing)*, and H. M. SCOTT. *(Illinois Agric. Expt. Sta., Urbana.)* INFLUENCE OF DIET ON EARLY MORTALITY AMONG INBRED LINES OF CHICKENS. *Poultry Sci. 29:* 685-691. 1950.—In certain inbred lines, of White Leghorn chickens mortality for the first 21 days after hatching was markedly influenced by the type of diet fed during the early post-hatching period. The reasons for these differences were genetic in nature. Differences in mineral content of the diet significantly influenced early chick mortality. Changes in fiber content had no pronounced effect on mortality but did influence growth to 8 weeks of age.—*N. F. Waters.* (Biological Abstracts)

WILLIAMS, H. H. STUDIES ON THE AMINO ACID COMPOSITION OF FEEDSTUFFS. *Feedstuffs 23:* 17, February 10, 1951.—Three microorganisms, as judged by criteria which will be discussed in detail, were found to yield the most uniform results for the so-called 10 essential amino acids and tyrosine. They are:

Streptococcus faecalis, A.T.C.C., No. 9790.
- Arginine.
- Isoleucine.
- Threonine.
- Tryptophan.
- Tyrosine.
- Valine.

Leuconostoc mesenteroides, A.T.C.C., No. 8042.
- Histidine.
- Leucine.
- Lysine.
- Methionine.
- Phenylalanine.

Lactobacillus arabinosus, A.T.C.C., No. 8014.
- Leucine.

The results obtained on a variety of protein-containing feeds furnished through the courtesy of the G.L.F. are presented in the accompanying table. (Experiment Station Record)

WILLIAMS, J. N. JR., M. L. SUNDE, W. W. CRAVENS, and C. A. ELEHJEM. *(U. Wisconsin, Madison.)* THE INFLUENCE OF FOLIC ACID UPON ENZYME SYSTEMS IN CHICK EMBRYO LIVER. *Jour. Biol. Chem. 185:* 895-901. 1950.—The effects of folic acid upon xanthine oxidase, endogenous respiration, and choline oxidase activity of embryo liver from incubated egg produced by hens either deficient in, or given, dietary folic acid are reported. In addition the influence of folic acid upon embryo liver nitrogen and uric acid are presented. Implications of the function of folic acid as a possible regulator of protein metabolism are discussed. It appears that some of the most pronounced effects of folic acid occur early in the development of the embryo.—*J. N. Williams, Jr.* (Biological Abstracts)

ANONYMOUS. TESTS SHOW WHEAT EXCELS RYE FOR CHICK FEEDING. *Amer. Miller and Processor 78:* 60. 1950.—A newly hatched lot of chicks fed ground wheat grew considerably faster than a group given ground rye in a feeding trial at the Nebraska Agric. Expt. Station. Shorts in bran were supplemented by wheat and rye in the 2 rations; otherwise the ingredients in both diets were about the same, with equal consumption of dry matter and N. Previous comparative feeding expts. led to the conclusion that rye could safely replace wheat or barley up to 20% of the ration but that 30% of rye resulted in digestive disturbances. In this recent series of tests comparing ground wheat and ground rye, the feeds were mixed in such a way that 25% of the protein was afforded by either wheat or rye. The wheat in the controlled diet contained 18.1% of protein and the rye had 15.7%. A mixture of 26 lbs. of wheat and 4 lbs. of dextrin was included in the wheat diet to insure the same quantity of protein as that in the 30 lbs. of rye in the other ration. Cod-liver oil concentrate was included in the mashes at mixing and before pelleting. There were 18 chicks on the wheat diet and 17 on the rye ration. During the 6-week feeding test, each chick ate 896 g. of feed, receiving 820 g. of dry matter, 169 g. of protein and 27.15 g. of N. The group of chicks eating the wheat diet made a greater rate of flesh gain and retained a larger per cent of N than the rye-fed lot. Both males and females in the wheat-fed group were 6% heavier than the lot given rye. Appropriate tests showed that this difference is highly significant statistically.—*J. M. MacKenzie* (Biological Abstracts)

BRITISH AGRICULTURAL OFFICE, *Technical Digest No. 18,* p. 16, August to October 1950.

When salt was omitted from the ration containing normal quantities of manganese, no perosis occurred. This suggested that salt increased the

chick's requirements for manganese. In several cases of *perosis in turkeys*, where the addition of manganese was ineffective, the addition of penicillin to the diet prevented the ailment.

Similar work carried out at Washington State College on the SAVING EFFECT OF ANTIBIOTICS indicated that the addition of penicillin to the feed reduced the amounts of protein, energy and vitamins required in the diet. Penicillin was particularly effective in increasing the growth rate of chickens on diets marginal in vitamin B_{12}. Aureomycin, streptomycin and terromycin were not quite so effective as penicillin, but all four antibiotics when fed in high energy rations caused a considerable increase in feed efficiency.

It is now well established that built-up litter is a potent source of vitamin B_{12}. At the Ohio State University, the MICROFLORA OF BUILT-UP LITTER were investigated and 142 different microorganisms isolated of which all but 4 were capable of elaborating vitamin B_{12}. When white leghorn chicks were fed deep litter at the rate of 2½% of the diet (this litter, composed of corn cobs, which had carried hens on an all vegetable protein diet, for one year) growth rate was as good as that obtained by feeding 20 micrograms of A.P.F. supplement per kilogram of diet.

In T.D. 17, Section 8(a), we referred to the Beltsville work on VITAMIN B_{12}, ANTIBIOTICS AND CERTAIN AMINO ACIDS. The ration now being fed to chicks contains soybean meal, aureomycin, B_{12}, arsonic acid, folic acid, ascorbic acid and methionine. The chicks reared on this diet weighed 1.26 lbs. at 6 weeks, as compared with .85 lbs. for chicks on conventional diet and 1.09 lbs. for the group on the conventional diet plus B_{12}. (Experiment Station Record)

NEW VITAMIN HINTED. *Science New Letter 59:* 124, February 24, 1951.

Hint of a new vitamin or food element essential for rats at least and maybe for animals including man appears in a report from three Italian scientists to Science, (February 16).

The substance is found in crude casein, which is a protein from milk.

Newborn rats of the second generation deprived of this factor were saved by small quantities of whole cow's milk, but vitamin B_{12}, one of the animal protein factors, completely failed to save the animals. (Experimental Station Record)

PATHOLOGY

BEARD, W. A. PULLORUM DISEASE. *North Am. Vet. 32:* 164, March 1951.

If you look for one outstanding symptom, it will probably be the way the chicks huddle up in bunches of 15 to 50 or more. They stand with the eyes closed most of the time and there will always be some "cheepers" in the bunch.

I prefer sodium sulfamethazine or sodium sulfamerazine, 1 ounce of a 12½ percent solution to each gallon of water. The length of time it is given depends upon the course of the disease—never less than 48 hours at the start. As a general rule, I would say to use it on the first and second days, skip the third and fourth days, and administer again on the fifth and sixth days. (Experimental Station Record)

BOLIN, F. M., and D. F. EVELETH. (*North Dakota Agric. Expt. Sta., Fargo.*) NEWCASTLE DISEASE OF TURKEYS. *Bimo Bull. N. Dakota Agric. Expt. Sta. 13:* 12-13. 1950.—Newcastle disease of poultry has become well established in N. Dakota. Vaccination of turkeys with a killed-virus vaccine insures effective immunity about 2 weeks after the admn. of the antigen.—*J. F. Reed.* (Biological Abstracts)

FALLIS, A. MURRAY, D. M. DAVIES and M. VICKERS. NATURAL AND ARTIFICIAL INFECTIONS WITH LEUCOCYTOZOON SIMONDI MATHIS AND LEGER IN DUCKS. *Jour. Parasitology, 36:* 22, December 1950.

There was a high mortality among the ducks infected naturally but none among those infected artificially. Ducks exposed to continuous infection developed some tolerance or resistance to the parasite, but no marked resistance to infection was apparent following a single artificial or natural infection. Blood containing parasites in round and elongate host cells was transfused into non-infected ducks. Similar parasites in round and elongate cells were found for at least six days in the peripheral blood of the ducks receiving the transfusion. (Experiment Station Record)

GOLDSBY, A. I. POULTRY PARASITES NEW TO NORTH DAKOTA. *North Dakota's Bimonthly Bulletin 13:* 121, January-February 1951. (Experiment Station Record)

GORDEUK, S. JR., and G. O. BRESSLER. INFECTIOUS BRONCHITIS: ITS EFFECT ON RATE OF EGG PRODUCTION AND EGG QUALITY. *Prog, Rpt. No. 36, November 1950, Pennsylvania State College.*

Egg production was seriously impaired by an induced bronchitis infection of laying hens. Rate of production of the normal group during the 11-week period of the study averaged 55 percent while the infected group averaged only 31 percent.

Only 52 percent of the eggs laid by the infected group during the period of study were suitable for commercial handling.

On the average, albumen quality was about one commercial grade lower in eggs from bronchitis-infected layers. (Experimental Station Record)

JOHNSON, E. P., and W. B. GROSS. VACCINATION AGAINST PNEUMO ENCEPHALITIS (NEWCASTLE DISEASE) BY ATOMIZATION OR NEBULIZATION WITH THE B_1 VIRUS. *Veterinary Medicine, XLVI: 55,* February 1951.

Thirteen separate experiments were carried out with groups of chicks from 24 to 48 hours' old to determine the safety of atomization and nebulization with vaccine made from the B_1 Newcastle disease virus, which is of low virulence. The groups of chicks ranged in numbers from eight to 2,850. No losses were attributable to this method of vaccination. The resulting immunity compared favorably with that produced by this virus when administered by the intranasal-drop method on chicks from the same source and under similar conditions. This method has enormous potentialities for vaccination of baby chicks with vaccine made from the B_1 virus on a large scale with considerable saving of labor and expense in handling the chicks. (Experiment Station Record)

LUCAS, ALFRED M., and JANET B. BREITMAYER. *(U. S. Region. Poultry Res. Lab., East Lansing, Mich.)* LYMPHOID TISSUE AND ITS RELATION TO SO-CALLED NORMAL LYMPHOID FOCI AND TO LYMPHOMATOSIS. V. A STUDY OF LYMPHOID AREAS IN THE PANCREAS OF PHEASANTS AND WILD MALLARD DUCKS. *Poultry Sci. 29:* 450-461. Illus. 1950.—The pancreases of 89 pheasants from a Wisconsin game farm and of 26 wild Mallards from Michigan were used. A study of the lymphoid tissue within these pancreases showed about the same destructive effects on blood vessels, acinar tissue and islets which had been observed and reported in earlier papers of this series of other avian spp., and confirm a previous opinion that ectopic lymphoid areas are not normal for birds. The number of lymphoid areas per 25 sq. mm. of pancreas was used for quantitative studies. The ranking of the various groups of birds, based on the mean values and variance analyses, indicated that the White Pekin ducks (from a previous study) and pheasants had the least amt. of lymphoid tissue, Mallard ducks ranked next, and laboratory-resistant chickens had the most of any

of the groups compared. These results are in agreement with previous observations that the amt. of ectopic lymphoid tissue is approx. proportional to the predisposition toward lymphomatosis. The various possible relationships between the agent of lymphomatosis and ectopic lymphoid areas are discussed.—*Authors.* (Biological Abstracts)

McGHEE, R. BARCLAY and W. TRAGER. THE CULTIVATION OF PLASMODIUM LOPHURAE IN VITRO IN CHICKEN ERYTHROCYTE SUSPENSIONS AND THE EFFECTS OF SOME CONSTITUENTS OF THE CULTURE MEDIUM UPON ITS GROWTH AND MULTIPLICATION. *Studies from The Rockefeller Institute for Medical Research. 141:* 505, 1951.

In previous work (Trager, 1947) it was found that cultures of *P. lophurae* in duck red cell suspensions in certain instances tripled in numbers within 2 days. Although this rate was not achieved in this study, parasites in cultures containing duck red cells multiplied to a greater extent than in original cultures with chick red blood cell suspensions. This is in agreement with the greater pathogenicity of *P. lophurae* for ducklings than for chicks. (Experiment Station Record)

PEREZ, J. E. and L. M. GONZALEZ. NEWCASTLE DISEASE IN PUERTO RICO. *Jour. A. V. M. A. 118:* 107 ,February 1951. (Experiment Station Record)

RAI, JARJAS and S. P. BERI. HEAT STROKE IN POULTRY. *Indian Farming, 11:* 122, March 1950.

A scientific study of the subject has been made with Australorps in Australia by some workers and their conclusions are as follows:

(1) Death is likely to occur when shade temperatures exceed 105°F. and the exposure is for more than one hour.

(2) Hens are less likely to die if given an opportunity to become acclimatized.

(3) At 113°F. (rectal temperature) true heat stroke is noted and death follows unless prompt treatment is given.

(4) When the rectal temperature reaches 108°F. the hen will start panting.

(5) When panting the evaporation of water from the hen rises to one ounce per hour.

When the acute attack is passed, about 10 to 15 grains (according to the size of the bird) of epsom salt may be given in half an ounce of water. Potassium iodide (one to two grains) in water given orally has also been found quite useful. (Experiment Station Record)

TRELEASE, SAM. F. and ORVILLE A. BEATH. SELENIUM POISONING IN ANIMALS: POULTRY. *Copyright 1949.* p. 211, 215.

Since the settlement of western South Dakota and northern Nebraska in about 1890, residents of certain regions have found that eggs from the chickens on their farms do not hatch satisfactorily, either by natural or artificial incubation (Peters, 1904; Franke et al., 134e). The cause has been assumed to be the same as that of alkali disease in livestock. Chicks from the few eggs that do hatch have down that appears greasy or wiry and never becomes fluffy.

Chicks that received 2, 5, or 8 ppm. of selenium in their starting rations grew as rapidly as those receiving no selenium. But 10 ppm. in the starting ration reduced the growth rate, and 14 ppm. was markedly toxic, causing reduced growth and high mortality.

Arsenic at a level of 2.5 ppm. in the drinking water for laying hens receiving a ration containing 10 ppm. of selenium from wheat partially counteracted the effect of selenium on hatchability (Moxon and Wilson, 1944b). At a level of 5.0 ppm. it was more effective, but did not completely counteract the toxic action of the selenium at a level of 10 ppm. (Experiment Station Record)

WAGNER, J. C., V. W. ANDREW and M. S. WATSON. EFFECT OF AUREOMYCIN ON VIRUSES OF THE PSITTACOSIS-LGV GROUP IN EMBRYONATED EGGS AND MICE. *Proc. Soc. Expt. Biol. and Med. 76:* 79, January 1951.

Aureomycin was effective, in both embryonated eggs and in mice, in controlling experimental infections with 10 strains of virus in the psittacosis-lympho-granuloma venereum group. (Experiment Station Record)

ANTIBOTICS NUMBER 141. Seven basic mold remedies are now commercially available. Production of penicillin in January, 1950, had reached 16 trillion units per month. *Science News Letter, 58:* 391, December 16, 1950.

Of the 141 antibiotics listed by Dr. Baron, there are seven so-called basic ones that are commercially available. These are penicillin, streptomycin, chloramphenicol (also known as chloromycetin), aureomycin, bacitracin, tyrothricin, and terramycin. (Experiment Station Record)

DYED FORAGE SEED UNATTRACTIVE TO BIRDS. *Crops & Soils, 3:* 25, February 1951.

When grass and legume seeds are dyed a brilliant yellow, and treated with a new posion compound, they are safe from birds, ants and rodents, according to W. E. Howard of the University of California.

Howard has been using seed treated in various ways to re-grass burned-over brushlands and reduce erosion on mountain slopes. He found that birds consistently refused seed that was colored with a dye called National Brilliant Yellow S. P. The poison, known as compound 1080, is highly toxic—with no antidote known. However, rodents don't like the taste and hence avoid it. Ants, on the other hand, are destroyed by it and cannot remove the seeds.

The germination and growth of the forage seed was not affected, says Howard, by either the dye or the poison. (Experiment Station Record)

RESPIRATORY DISEASES. *British Agricultural Office, Technical Digest No. 18,* p. 13, August to October 1950.

In New Jersey, the live virus is used for fowl pox and it is a common occurrence for a severe attack of *blackhead* to occur amongst *chickens* 11-16 days after vaccination. This does not occur when the pigeon-pox type is used. It is surmised that a great number of chickens harbour the blackhead organisms and have learned to live with it, but when they are temporarily debilitated by the live vaccine, the blackhead flares up and is of considerable economic importance.

Enheptin (2-amino-5-nitrothiazole) produced by the Lederle Laboratories, is the first drug which effectively controls BLACKHEAD IN TURKEYS. The recommendations are to feed a mash containing .05% Enheptin for 10 days before the danger age until 14 days before slaughter; to control an outbreak, feed .1% in the mash for 14 days. Enheptin is only slightly toxic to mammals. (Experiment Station Record)

RESPIRATORY DISEASES. *The North American Veterinarian, 32:* 99, February 1951.

There is no specific treatment for coryza, but if you get there soon enough, you can do a lot of good. First, see that waterers are of a type that cannot be contaminated with droppings. Get sodium sulfamethazine or sulfamerazine into the water at once—1 ounce of a 12.5 percent solution to each gallon of water for three days. You can then skip two days and repeat for two more days, if it seems necessary. I also prescribe an oil spray, such as you can get from any pharmaceutical house. (Experiment Station Record)

TURKEYS MORE SENSITIVE TO DDT THAN CHICKENS. *Utah Agr. Expt. Sta., Biaennial Report for 1948-50,* Bul. 343, p. 7, December 1950.

Immature turkeys seem to be the only animals that are poisoned by amounts of DDT ordinarily used to dust alfalfa for lygus bugs or weevil . . . DDT fed in this way was found to accumulate in the fatty tissues of the animals and in milk and eggs, but no poisonous effect could be discerned on any of these animals except immature turkeys which developed typical symptoms and were killed by a DDT level of 200 parts per million. Chickens fed the same level of DDT were not affected. (Experiment Station Record)

POULTRY PRODUCTS AND MARKETING

DAWSON, L. E., J. A. DAVIDSON and C. C. SHEPPARD. FARM PRACTICES AND EGG QUALITY: PART I. FACTORS AFFECTING QUALITY OF NEW LAID EGGS. *Michigan Quarterly Bulletin 33:* 229, February 1951.

Incidence of blood and meat spots increased erratically from October through August. This increase averaged more than one percent a month throughout the year.

The egg shell quality (subjective measurement) remained relatively constant from September to April, then decreased sharply in the summer months. This decrease was probably due to age of flock and environmental conditions.

Greatest breed differences were observed in incidence of blood and meat spots. Leghorn eggs had lowest frequency of spots and Barred Rocks highest. As a group the heavy breeds produced a much higher incidence of spots. (Experiment Station Record)

LORENZ, F. W. THE APPLICATION OF "BLACK LIGHT." *Am. Egg & Poultry Review, 11:* 16, October 1950.—Most sour eggs are eggs that have been infected with fluorescent *Pseudomonas* organisms. These bacteria digest some of the egg contents and produce the substances that are responsible for the abnormal odors. They also produce a pigment that diffuses throughout the albumen and has a brilliant green fluorescence when illuminated with ultraviolet light. This pigment is the key to detecting sour eggs while in the shell. Ultraviolet light of the right wave-length and sufficient intensity can penetrate the shell and excite the fluorescence which lights up the egg with a bright green glow.

One other use has been suggested for ultraviolet light which is entirely different from that described above, and yet is closely related to the sour egg problem. This use is the determination of whether or not eggs have been washed.

Egg shells have their own fluorescence under ultraviolet light; white shells fluoresce purple and brown shells crimson. This fluorescence is usually blotched or streaked when the egg has been soiled, and these blotches remain after the egg has been washed. (Experiment Station Record)

LORENZ, F. W. *(U. California, Davis.)* EGG WASHING FIELD TRIALS. *California Agric. 4:* 15-16. 1950.—The only safe eggs to store are clean eggs produced clean and unwashed.—*G. W. Bohn.* (Biological Abstracts)

McALLISTER, W. T., A. F. KISH, and R. O. BAUSMAN. CONSUMER PREFERENCE FOR FRYING CHICKEN STUDIED. *Am. Egg & Poultry Review 11:* 30, December 1950. (Experiment Station Record)

NADEN, K. D., and G. A. JACKSON, JR. QUALITY OF FRESH CHICKEN MEAT. (Causes of downgrading of chickens handled in the Los Angeles market revealed in representative survey.) *California Agr. 5:* 10, February 1951. (Experiment Station Record)

POOL, M. F., H. L. HANSON, and A. A. KLOSE. *(Western Reg. Res. Lab., Albany, Calif.)* EFFECT OF PREFREEZING HOLD TIME AND ANTIOXIDANT SPRAY ON STORAGE STABILITY OF FROZEN EVISCERATED TURKEYS. *Poultry Sci. 29:* 347-350. 1950.—Frozen eviscerated turkey halves were stored for 18 mos. under various exptl. conditions. Holding at 36°F. for 30 hrs. prior to freezing, compared to immediate freezing, did not result in detectable flavor differences. Application of nordihydroguaiaretic acid in propylene glycol reduced the peroxides and off odors, as compared to the propylene glycol control, but had no effect on the quality of cooked meat. The relatively slow deterioration of these turkeys compared with commercial turkeys and the deteriorative effect of the sample of propylene glycol used were also noted.—*M. F. Pool.* (Biological Abstracts)

MANAGEMENT

CAMPOS, AMADO C. *(University of the Philippines, College of Agriculture, College, Laguna).* THE USE OF THE SUN PORCH FOR LAYING PULLETS. *The Philippine Agriculturist, 33:* 197-202. 1950. —This study is a comparison of the performance of two pens of S. C. White Leghorn pullets one of which was provided an ordinary ground run and the other with a sun porch. The layers received similar ration. The results of one-year observation showed that, although there was no significant difference in the amount of feed consumed by each bird in both lots, the pullets provided with a sun porch were slightly inferior in egg production to those provided with a ground run. The rate of mortality was markedly higher in the sun porch lot than in the ground lot. It was concluded that there was no apparent advantage in the sun porch over that of the ground run.—*F. M. Fronda.*

HENDERSON, D. C., and H. C. WELDEN, JR. *(U. Vermont, Burlington.)* RANGE REARING LOWERS PULLET COST. *Poultry Tribune 56:* 10, 20-24. 1950.—In a 2-yr. period White and Barred Plymouth Rocks on range consumed in a 24-week growing period 2.4 lbs. less feed than birds reared in confinement.—*F. P. Jeffrey.* (Biological Abstracts)

HOFFMANN, EDMUND, and BRUCE HANCOCK. *(U. Georgia, Athens.)* THE EFFECT OF LENGTH OF DAY ON EGG PRODUCTION OF GEESE AND GUINEAS. *Poultry Sci. 29:* 469-471. 1950.—Limited observations suggest that the goose responds to increased length of exposure to light in the same manner as the fowl. Guineas *(Numida meleagris)* exposed to all-night lights for 4 weeks from Dec. 28,1949, exhibited no observable response. The latter finding is not considered to be definitive because the guineas were less than 1 yr. old and the marked change in environment from free range to confinement may not have been psychologically suitable for egg-laying to occur.—*Edmund Hoffmann.* (Biological Abstracts)

LANDAUER, WALTER. *(U. Connecticut, Storrs.)* THE HATCHABILITY OF CHICKEN EGGS AS INFLUENCED BY ENVIRONMENT AND HEREDITY. *Storrs Agric. Expt. Sta. Bull. 262.* 7-231. Illus. 1948.—This publication attempts to review in considerable detail and critically all evidence that has a bearing on the causes of embryonic mortality of chicken embryos during artificial incubation. Following a brief general introduction there is a chapter dealing with the history of artificial incubation from Egyptian and Chinese antiquity to the beginning of the industrial manufacture of incubators. This chapter contains much material that is here brought together for the first time from original sources. The biological text opens with a discussion of the physical environment of hatching eggs prior and during incubation. The most important factors considered under this heading are temp., humidity, air pressure and mechanical agitation. The next chapter deals with the chemical environment during incubation (O_2 and CO_2). This is followed by a section in which are discussed egg traits influencing hatchability, namely the size and shape of eggs and particular qualities of shell, albumen and yolk. There follows a discussion of nutritional factors in hatchability under the headings vitamins and hormones, proteins and fatty acids, minerals. The next chapter deals with age and reproductive activity of parent stock as factors in hatchability. The specific subjects covered are: age, antecedent and current egg production, time of the day when the eggs are laid, time intervals between the laying of eggs, position of eggs in the clutch, fertility and age of sperm cells. The metabolism of laying hens as a factor in the hatching of eggs laid by them is considered next. This is followed by a chapter on genetic factors affecting hatchability. The subjects discussed under this heading include a description of the sixteen known lethal factors of fowl, sex as it affects embryo mortality, the effects of inbreeding and heterosis, the relative contributions of the parents to survival past the embryonic period and a discussion of the question whether or not

specific "hatchability genes" exist. The next chapter deals with the influence of various developmental events on embryo survival. The principal subjects dealt with are as follows: embryo growth and hatchability, malpositions, the occurrence of embryo malformations as an index of incubation conditions, the relationship between prenatal and postnatal mortality and the significance of peaks of embryonic mortality. The final chapter contains the evidence on bacterial contamination of eggs as a cause of embryo mortality. The bulletin closes with a bibliography covering 53 pages.—*Walter Landauer.* (Biological Abstracts)

MENDOZA, TEOFILO M. *(University of the Philippines, College of Agriculture, College, Laguna).* THE FLOORSPACE REQUIREMENTS OF BROILERS. *Philippine Agriculturist, 33:* 257-262.—This paper is a report of the results of study conducted in the Department of Agricultural Engineering and Animal Husbandry of the College of Agriculture, University of the Philippines, to determine the amount of floor space required by growing chicks for the most economical production of broilers under Philippine conditions. The author concluded that, taking into consideration all production factors in broiler raising, the study seems to point out that at least 0.6 square foot (557.28 sq. cm.) of floor space must be allowed each bird. This allowance is true for both the New Hampshire and the White Leghorn breeds.—*F. M. Fronda.*

SEEGER, K. C. *(U. Delaware, Newark.)* INFRA-RED BROODING TESTED. *Poultry Tribune 56:* 7, 18-19. 1950.—Chicks brooded in a refrigerated room (–5° to 15°F.) under infra-red bulbs weighed 1.9 lbs. more than those brooded with coal brooders in a typical brooder house.—*F. P. Jeffrey.* (Biological Abstracts)

SUWAN, LUANG. *(College of Agriculture, Bangkhen, Bangkok, Thailand).* POULTRY HOTEL. Kasikorn, 23: 419-425. 1950.—The author described the raising of layers in individual laying batteries in Thailand. This system, according to him, has high hopes for success in that country as it is simple and not difficult to operate. It can be made into large or small industry to suit the requirements of all classes of people. What is most important is that there is very little danger from diseases, the principal cause of failure of poultry raising in Thailand.—*F. M. Fronda.*

MODERN DESIGN IN CHICK SEXING. *Hatchery & Feed 25:* 64, February 1951.—Illustrations were furnished through the courtesy of Lewis Mortensen, Sex-Chick Co., Lancaster, Pa., and requests for more details should be referred to him. This information with more intimate details for students, will appear in the next revised edition of Hatchery Management, by Hartman & Vickers. This book is for sale by Hatchery and Feed. (Experiment Station Record)

GENERAL

CHAPEL, A. GONZALEZ. COMPARATIVE PERFORMANCE OF THE NATIVE PUERTO RICAN FOWL, THE WHITE LEGHORN, THE NEW HAMPSHIRE, AND CROSSES BETWEEN THEM. *Jour. Agr. of Univ. Puerto Rico 31:* 265, October 1947, *Issued, June 1950.*—It was found that the productive capacity of the Native fowl, as judged by egg production, egg weight and body weight, was inferior to that of the White Leghorn and New Hampshire. The Native crosses showed improvement over the pure Natives, but were inferior to the standard breeds although there was some indication that they may possess a greater amount of disease resistance.

Under the conditions of the experiment there was no apparent superiority of the pure Natives over the imported breeds in respect to viability and resistance. (Experiment Station Record)

FRONDA, F. M. *(University of the Philippines, College of Agriculture, College, Laguna).* RAISE CHICKENS FOR PROFIT. *Agricultural and Industrial Life 12:* 3, 24.—Using actual figures obtained in observations made at the College of Agriculture, University of the Philippines, it was shown that with the proper "know how" chickens may be raised in the Philippines for profit. Capital invested in poultry farming will not only mean money and independence for the poultry farmer but also he will be helping in the efforts of the government to increase the food supply of the nation.—*F. M. Fronda.*

FRONDA, F. M. *(University of the Philippines, College of Agriculture, College, Laguna).* IS THERE MONEY IN POULTRY RAISING? *Poultry Messenger, 1:* 4. The author showed that with proper kind of stock, with good feeding, and with proper care, poultry raising may be profitably carried on as a business undertaking.—*F. M. Fronda.*

GOWE, R. S. *(U. Cornell, Ithaca, N. Y.)* TECHNIQUES FOR IDENTIFYING FERTILE HENS' EGGS. *Poultry Sci. 29:* 409-413. 1950.—Technics described by Kosin for the macroscopic and microscopic identification of fertility in hens' eggs have been tested and shown to have great utility to those engaged in studying fertility in the domestic fowl. Among 642 eggs thus examined, first by the naked eye and then fixed, stained, and examined microscopically, only 24 eggs, or 3.7%, were found to have been classified incorrectly by the first procedure. However, when all questionable eggs were examined microscopically that error dropped to 1.2%. This combination of technics, whereby only the doubtful eggs were examined microscopically, gave excellent results in practice. Fertile blastoderms which seemed to be degenerating, and which had lacunae around the periphery of the blastoderm, were responsible for most of the error in the macroscopic classification.—*R. S. Gowe.* (Biological Abstracts)

KLEIN, G. T. *(U. Massachusetts, Amherst.)* NO ROOSTS USED HERE. *Poultry Tribune 56:* 15, 61. 1950.—Description of a 2-story 40 x 80 ft. laying house where no roosts are used. Deep litter is essential.—*F. P. Jeffrey.* (Biological Abstracts)

SUWAN, LUANG. *(College of Agriculture, Bangkhen, Bangkok, Thailand).* POULTRY RAISING AS A PROFESSION. *Kasikorn, 23:* 172-182. 1950.—The author pointed out the fact that there are several commercial poultry farms newly established in Thailand. This, together with results of the egg laying contests in that country in recent years which showed definite trend of improvement, seem to indicate the suitability of Thailand conditions for poultry raising. Two main problems of commercial poultry raising in Thailand are the improvement of breeds and the suppression of diseases. The author also described different types of poultry farms that he observed in his recent visit to Europe and the United States.—*F. M. Fronda.*

TAYLOR, L. W., *et al. (U. California, Berkeley.)* POULTRY HUSBANDRY REPORT, 1949. *California Agric. 4:* 3-4. 1950.—An important balance exists between amino acid levels and total protein levels in diets for chickens and turkeys. Raw soybeans, alfalfa meal and raw potatoes contain growth inhibitors. Live yeast promotes faster growth of cockerels but not pullets. Family averages are much more valuable than individual records in breeding work with characters of low heritability. The family averages are slightly more valuable in work with characters of high heritability. The frequency of blood spots in eggs and of crooked toes are affected by genetic factors. Production bred lines laid 100 more eggs per bird per yr. than the foundation stock. Inbreeding reduces hatchability. Rate of growth during the first 2 or 3 mos. varies in different turkey strains. Different individuals and strains of turkeys differ in several fertility characters. Chickens given all night lights do not produce more marketable eggs than those given a 14-hr. day, but begin to lay earlier. Only clean unwashed eggs should be stored. Eggs should be washed only when they are to be used im-

mediately. Chickens are sensitive to high temps. and high humidities. Meat from poultry killed after a long fast tends to be slightly alkaline and inferior in flavor.—*G. W. Bohn.* (Biological Abstracts)

POULTRY COSTS AND RETURNS. *Livestock Costs and Returns in Southeastern Indiana, Sta. Bul. 550,* May 1950, p. 15-17.—In each of 6 flocks returns per $1 feed fed were more than $2.50; in each of 3 other flocks less than $1. Poultry returns per hour of labor were more than $2 in each of 7 flocks and less than $0 in each of 11 other flocks. Parts of the differences in returns were associated with differences in size of flock or in methods of feeding and management.

The 14 flocks with the highest feed costs per 100 hens averaged only 55 cents returns per hour of labor compared to $1.20 for the 14 flocks with the lowest feed costs. The 14 flocks with the largest amount of labor per 100 hens (more than 222 hours) averaged 49 cents returns per hour of labor, compared to 94 cents for the 14 flocks with the smallest amount of labor (less than 66 hours).

Note:

The Experiment Station Record, published by the Office of Experiment Stations, United States Department of Agriculture, was discontinued as a publication several years ago. References to "Experiment Station Record" in some of the items of this abstract material, therefore, refer not to the publication of this name but to the records kept by the Office of Experiment Stations.

WANTED

WORLD'S POULTRY CONGRESS PROCEEDINGS

Inquiries concerning the proceedings of the following previous World's Poultry Congresses have been recently received: Holland (1921), Spain (1924), Italy (1933), Germany (1936), United States (1939). If any person has any of these Proceedings and would care to dispose of them please notify Dr. G. F. Heuser, Rice Hall, Ithaca, N. Y., U.S.A.

Important Notices To Members Of The World's Poultry Science Association

ELECTION OF OFFICERS AND MEMBERS OF COUNCIL

Notice is hereby given that, in terms of the Constitution of the World's Poultry Science Association, the elections of its Officers and Members of Council will take place at the Triennial Meeting of the Association to be held at the time of the Ninth World's Poultry Congress in Paris, France 2nd-9th August 1951.

The meeting of the Council will be held at 15.00 hours (3 P.M.) on 5th August 1951 in the Grand Hotel, Rue de Scribe, Paris.

It has been previously arranged to hold the General (Triennial) Meeting of the Association at 14.30 hours (2:30 P.M.) on 9th August at the Sorbonne, Paris. Confirmation of the date, time and venue of the Meeting will appear in the Official Programme to be issued by the French National Committee.

In this connection particular attention is drawn to the following Sections of Article VI of the Association's Constitution which governs these appointments:

1. The Officers of the Association shall consist of a President, three Vice-Presidents or more, Honorary Past Officers, a Secretary and a Treasurer. *See Section 8.

2. The affairs of the Association shall be managed by its Officers and a Council composed of such number of individual members of the Association from each country represented in the Association, having five or more members, according to the following schedule: five to twenty-five members, one member of Council; twenty-six to fifty members, two members of Council; for each fifty members over the first fifty members, one additional member of Council as soon as one half of a group of fifty has been reached. No country shall have more than 10 members of Council.

3. The term of office as President, Vice-Presidents, Secretary and Treasurer shall be three years. Each Member of the Council shall be elected for six years. The elections shall be held at the Triennial Meetings of the Association.

4. For the election of President, Vice-Presidents, Secretary and Treasurer a three-fourths vote of the Council shall be required, and such election shall be at the Triennial Meetings. Nominations for these offices may be made in writing by any Member of the Association or by the Council.

5. One-half of the Members of the Council shall be elected every three years at the Triennial Meetings. Nominations for the Council may be made to the Secretary in writing by any Patron or Affiliated Body or Branch Organization or Member of the Association of the country concerned. If no nominations are received from such Members, nominations may be made by any Member of the Council. A majority vote of the Council shall be required for election.

6. In all votes of the Council the requisite majorities specified in the foregoing clauses shall be construed as of those voting.

8. The term of office in each case shall begin on January 1st following election. *See Section 1.

Nominations should reach me not later than 15th July.

IAN MACDOUGALL,
Secretary.

The present Officers and Members of Council are:

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Based on the present list of members, the following countries are entitled to the number of Members of Council as indicated against their respective names:
Australia (1); Belgium (1); Canada (2); Denmark (2); Eire (1); England and Wales (7); France (1); Germany (2); Holland (2); Israel (1); Italy (1); New Zealand (1); Northern Ireland (1); Norway (1); Pakistan (1); Scotland (2); South Africa (1); Spain (1); Sweden (2); Switzerland (2); U.S.A. (10).

SUBSCRIPTIONS FOR 1951

Your attention is called to Article XI of the Constitution which reads:

"The annual subscriptions are payable in advance on January 1st in each year to the Treasurer or whom he may designate. In case of failure to pay the subscription *before June 1* the Member's name shall be removed from the mailing list of the Journal until renewal of his subscription. In the case of failure to pay the subscription before the end of the year, membership in the Association will be forfeited."

Please remit to the Treasurer-Assistant Secretary, Dr. Gustave F. Heuser, Rice Hall, Cornell University, Ithaca, N. Y., U.S.A. or to the Secretary-Assistant Treasurer, Major Ian Macdougall, 5 Chandos Street, London, W.1., England.
Individual Membership—$3.00 or one Pound.

Members of the United Kingdom Branch of the World's Poultry Science Association should forward 5 shillings additional to Major Macdougall.
Affiliated Membership—$15.00 or five Pounds.

For the convenience of the members in certain countries arrangements have been made for payment of subscriptions to persons in those countries. The following have consented to receive the subscription in their respective countries:

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UNITED KINGDOM BRANCH

The 4th Annual General Meeting of the United Kingdom Branch of the World's Poultry Science Association was held in London on the 13th of April when the Annual Report and Accounts for 1950 were presented. Membership increased by 49 during the year, making a total, on December 31st of 308 paid-up members. Two Conferences were held during the year, in March and December. At the former, symposia on Fowl Paralysis and Hatchability were presented and at the latter a symposium on Turkeys. Papers on Fowl Paralysis were presented by Dr. R. Coles, Messrs. C. L. Darcel, D. J. G. Black, Keith Wilson and J. E. Wilson and on Hatchability by Miss E. E. Kidd and Messrs. A. G. Cook, W. Bolton, V. Newman and T. E. Knowles. At the December conference papers were presented by Messrs. R. Chalmers Watson, D. L. Hughes and J. A. B. Tabor. A gratifying feature of the conferences was the large attendance of members.

Dr. R. Coles was elected President and Major I. Macdougal, Secretary-Treasurer.

A Congress followed the Annual General Meeting at which the following papers were presented: Ventilation and its Application to Poultry Housing by C. N. Davies and Electricity in Poultry Housing and Appliances by P. G. Finn-Kelcey.

ADDITIONS TO MEMBERSHIP LIST OF THE WORLD'S POULTRY SCIENCE ASSOCIATION

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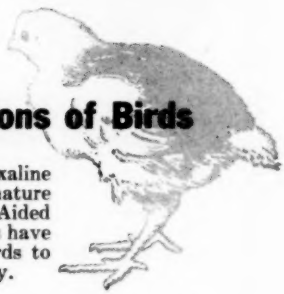

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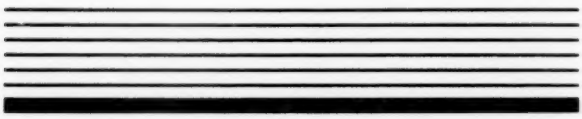

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